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The Great White Egret in Britain

Breeding biology of the Common Buzzard

British Birds

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Front-cover photograph: Common Buzzard *Buteo buteo* with a Red-legged Partridge *Alectoris rufa*, Warwickshire, January 2013. *Mike Lane*

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A combination of the title of Jeremy Greenwood's *BB* eye, and the subject matter of Chas Holt's paper in this issue – the rise and rise of the Great White Egret – got me thinking. When was Great White Egret a TICK for me? Answering that question proved less than straightforward. Since moving to Shetland, time and cost have been an effective barrier to British listing and my older records are not in the shape they ought to be. Eventually, I tracked down the relevant checklist, and discovered that a bird at Cley in April 1993, a whisker over 20 years ago, was a full-blown lifer for me. While I have never been in contention for a listing award from Lee Evans, I had probably seen close on 400 species in Britain at that point; which helps to emphasise, to me at least, just how rapidly the status of this species has changed.

An even more remarkable change in fortunes is evident in the Common Buzzard population of Robin Prytherch's study area in Avon. I think that the maps in his fig. 1 (pp. 266–267), showing the number of territories increasing from 19 to 92 in just 20 years, make one of the most striking illustrations we've published for a while. Since Robin is an amateur, and won't mind me labelling him as one, the second part of his mission to write up his Buzzard work in *BB* will no doubt please Peter Bircham, who kicked off our new series, 'Talking point', so successfully last month. Since then, there has been plenty of discussion about the rise and fall of the amateur birdwatcher. More generally, it is great to see items that we've published recently generating debate – the letters pages in this issue cover a variety of topics, while next month will see a selection of the responses to Nigel Collar's article in the March issue – keep it coming!

Roger Riddington

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BB eye

Introduced species: to tick or not (and is that the right question?)

'Do you think', I was asked over coffee at the bird club, 'that Rose-ringed Parakeets [*Psittacula krameri*] are tickable in Fife?' The underlying question was whether the individuals that have been seen increasingly often in the county are wanderers from established (non-native) populations or are birds that have recently escaped. There is no easy answer. As to what we should do about introduced species, that is even more difficult, because everyone has their own opinion.

What is not in doubt is that introduced species cause problems all around the world. In Britain we only have to think of the economic and health damage resulting from Rabbits *Oryctolagus cuniculus* and rats *Rattus* or the damage to our native fauna caused by American Mink *Mustela vison* and Grey Squirrels *Sciurus carolinensis*. In terms of economic damage, the question of controlling the species responsible is one that most of the (human) population would find easy to answer: they would always place the rights of man ahead of the rights of rat. But there are people who would argue that it was men who introduced rats so it is men, not rats, who should take the consequences.

The issues become more complicated when introduced species cause problems for native species, such as Grey Squirrels transmitting disease to native Red Squirrels *S. vulgaris*. Most people tend to favour native over introduced species. One reason is that this supports the conservation of biodiversity. If biodiversity was just local species richness, the establishment of the Rose-ringed Parakeet could be said to enhance biodiversity. But biodiversity means more than local species richness. It also means the differences in fauna and flora on a larger scale, such as the differences between continents in their species complements. Thus an interest in global biodiversity means that we should be concerned with maintaining these differences across the globe rather than having the same mix of common species on every continent. From this perspective, Ring-necked Parakeets belong in India, not in Britain.

Further value judgements arise when we start to consider what should be done to manage populations of introduced species, especially when 'manage' means 'eliminate'. Some people think that we should not kill anything, even to save native species. This is a reasonable value judgement, even if one disagrees with it. Arguing, as many do, that it is supported by observing that the extinction of native species is a natural part of the evolutionary replacement of some species by others is, however, wrong: the extinctions brought about by human activities are occurring at many times the natural rate. At the other extreme are those who argue that we should eliminate introduced species whenever possible and especially if the benefit of doing so exceeds the cost. But what if the benefit is not directly economic? What value do we place on saving the Red Squirrel? Furthermore, the removal of some long-established introductions may well have extensive unpredictable consequences: what would be the effect on native predators if we were to eliminate rats and Rabbits?

Another point of view is that we should be prepared to control introduced species but only when they become a problem. After all, most introduced species never establish themselves and most of the few that do so do not cause problems. But by the time we know that a species is causing problems, it has often become too common to manage easily. It is better to prevent introductions in the first place but that requires both adequate legislation and adequate enforcement.

No doubt all these views, and others, are represented among *BB* readers. But I hope that all will agree that no policy for introduced species can be effective unless we have good knowledge of their status and distribution. Regardless of whether or not we consider them 'tickable', it is important to send sightings of introduced species to the relevant county recorder or put them into BirdTrack.

Jeremy Greenwood

News and comment

Compiled by Adrian Pitches

Opinions expressed in this feature are not necessarily those of *British Birds*

Birdfair of the north

Building on a hugely successful debut last year, the second Scottish Birdfair takes place this year on the weekend of 11th–12th May. With some 4,500 visitors last year, there are hopes that this event, the natural complement to the British Birdwatching Fair at Rutland Water in August, will build on this and become a regular fixture in the birding calendar. The fair is organised by RSPB Scotland and held in the spectacular grounds of Hopetoun House, in South Queensferry – where mature woodland on the banks of the Firth of Forth provides a decent place for birding, before and after the main event.

There will be more than 100 wildlife-related stands, with everything ranging from state-of-the-art optics and the latest in wildlife technology, through books and artwork, to information on Scotland's bird observatories. Like its English counterpart, there will be a wide range of presentations from the likes of Roy Dennis, Bo Beolens and the well-known Scottish artist Derek Robertson.

Stuart Housden, Director of RSPB Scotland, said: 'In this Year of Natural Scotland, the Scottish Birdfair is not just a celebration of Scotland's amazing wildlife, it *also* provides an ideal opportunity for people to learn more about nature and enjoy a family day away from city life. As well as fascinating talks, there will be tips to try out in the garden, guided walks and interactive workshops for all ages. Whether you are new to watching wildlife, or an old hand like me, this is a great opportunity to discover Scotland's natural environment.'

All the proceeds raised over the weekend will go towards conserving and protecting Scottish wildlife. RSPB Scotland has announced that the Corn Crake *Crex crex* will be the Fair's 2013 featured bird. Some of the latest research on Corn Crakes is described below. The findings from such projects help enormously when plotting the next phase of the conservation work needed to keep the Corn Crake momentum going. This iconic species is certainly a worthy flagship of the second Scottish Birdfair. To find out more, visit www.scottishbirdfair.org.uk

Corn Crakes – a Scottish conservation success story

Two hundred years ago, Corn Crakes *Crex crex* were widespread across much of Britain, but a population crash in the late nineteenth/early twentieth century correlates strongly with the replacement of hand-mowing of hay crops with mowing machines of increasing sophistication – which led to the large-scale loss of eggs and chicks in hayfields. By the end of the twentieth century, the Scottish islands held the bulk of what remained of the Corn Crake population – by 1993, only 480 singing males were left in the whole of the UK. The species' extinction looked likely but research by the RSPB showed that changes in the timing, and methods, of cutting hay and silage held the key to reversing the species' fortunes. Since that

Rhys Green/RSPB

150. Corn Crake *Crex crex* fitted with geolocator. This bird, retrapped on Coll in May 2012, helped to provide the data shown in fig. 1.

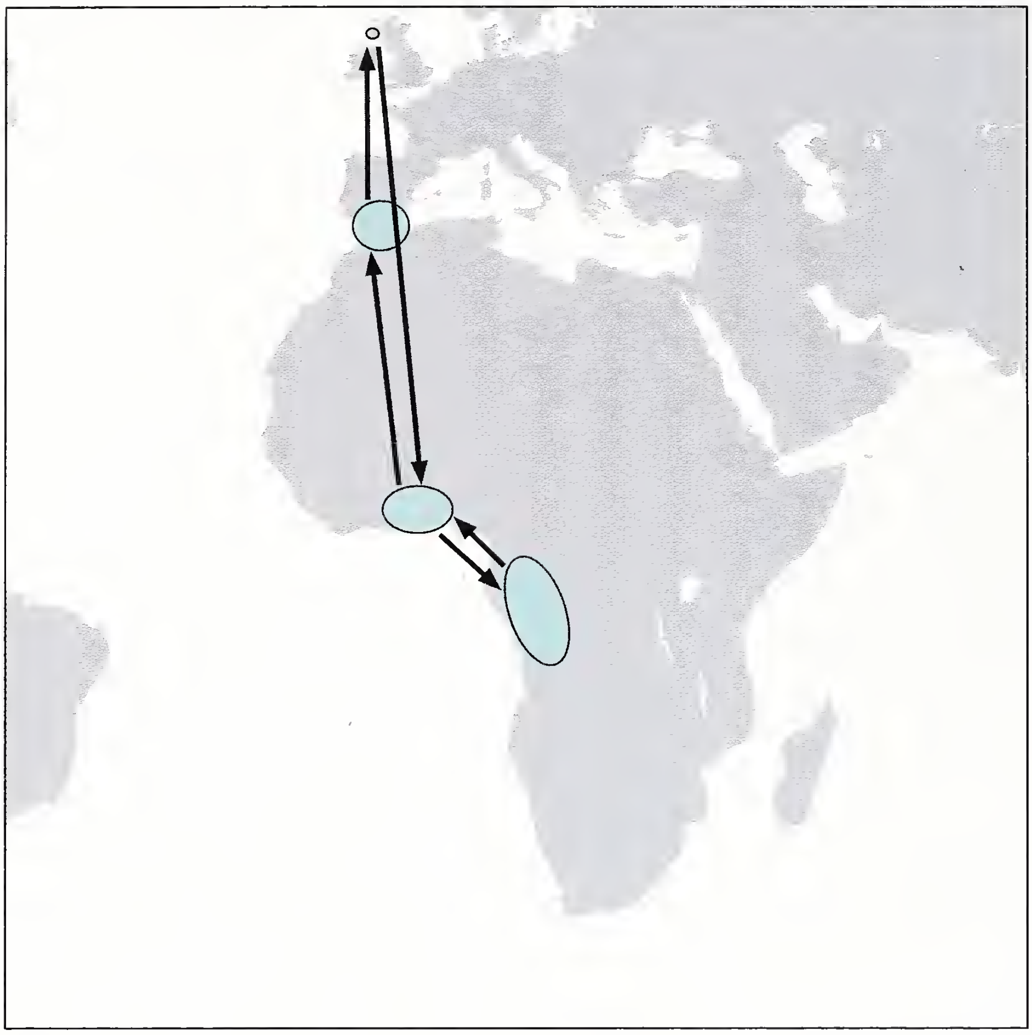

Fig. 1. Migration routes and stopover regions of Corn Crakes *Crex crex* from Coll.

time, the Corn Crake population has undergone a significant recovery, and there are now in the region of 1,200 singing males, and the population is stable. The recovery is not yet complete, though, and one significant gap in our knowledge is what happens to the birds on their migration – what routes they take and where exactly their main wintering grounds are.

In June 2011, 50 breeding male Corn Crakes were caught on the island of Coll. They were fitted with geolocators, which enabled researchers to track the birds' routes and final destinations. Since adult mortality is high, a large sample was needed, and in the event five birds were retrapped on Coll in 2012 bearing functioning transmitters (plate 150). The map (fig. 1) shows the findings. The birds moved rapidly south through Britain and France, into Africa, across the Sahara and arrived in West Africa in October. The five birds were spread over a wide area, from Ghana to Nigeria, yet each individual stayed in a fairly small range. Some 4–6 weeks later, the birds made a further movement, to the western part of Congo, a move perhaps stimulated by habitats in West Africa becoming increasingly dry. The return leg involved a return to West Africa, briefly, before the flight north, with a stopover in North Africa or Spain. These results are described in more detail in *Birdwatch* 250: 26–28 (April 2013).

The biggest Atlantic Puffin wreck yet

Wrecks of seabirds, in which large numbers of typically emaciated birds are washed ashore after prolonged onshore gales, occur periodically in the North Sea. The 2012/13 winter had already been noteworthy for a wreck of Shags *Phalacrocorax aristotelis* in eastern Scotland (see *Brit. Birds* 106: 60). In mid March, after another run of strong easterlies, it was Puffins *Fratercula arctica* that suffered. The first reports came from members of the Northeast England Beached Bird Surveys Group and on 24th March group co-ordinator Dan Turner put out an alert. It was soon clear that this was a major incident, with hundreds of Puffins and lesser numbers of other auks coming ashore between Yorkshire and North-east Scotland. Counts of corpses are still being collated but the total found will probably exceed 2,500. Since some birds will almost certainly have died at sea and others will have come ashore on beaches that were not searched, the actual number involved will be several times higher. The only previous incident of this magnitude that we are aware of was in February 1983, when 32,000 auks came ashore between Orkney and Kent. However, in 1983 Puffins were in the minority (c. 5%) whereas in the current wreck they make up over 80% of the casualties.

In late March, Puffins in eastern Britain return to breeding colonies and large numbers are relatively close to the coast. Indeed, recoveries of ringed Puffins from this wreck show that birds ringed on the Farnes and Coquet (8) were found mainly in Northumberland, Tyne & Wear and Yorkshire, while those ringed at colonies in the Firth of Forth (15) were found mainly between Lothian and North-east Scotland. The timing of the wreck, coupled with the strong onshore winds and the fact that some birds were still growing their wing feathers (so would still have been flightless), probably contributed to the large numbers of Puffins being stranded on beaches. Earlier in the winter and/or if winds had been offshore, we would probably have been unaware of the mortality.

As with most wrecks, there are now two key questions: why did it happen and what impact will it have on the population? All the Puffins we have examined so far have been emaciated, had empty stomachs, atrophied breast muscles and lacked subcutaneous and mesenteric fat – in other words the proximate cause of death appears to be starvation. Deciding whether this was due to lack of food, an inability to feed efficiently or to some other factor(s) is much more tricky. Currently, we are pulling together the available evidence to try to decide which of these scenarios is most likely. Razorbills *Alca torda* and Common Guillemots *Uria aalge* are also at colonies in March so why were these species less affected than Puffins? We have no direct information on the sandeels *Ammodytes*, other small fish and marine worms on which auks feed at this time of year. However, Puffins normally feed within 10 m of the sea surface and the swell, said by locals to be the largest for many years, may have made the upper part of the water column too turbulent for feeding efficiently; Razorbills and Guillemots, which dive much deeper, may have been able to cope better. Although disease is a possibility, it seems unlikely since Puffins were affected more or less synchronously over a wide area at a time when weather conditions were unusually severe for the time of year.

The Centre for Ecology & Hydrology has been monitoring Puffins on the Isle of May for over 40 years so by July we hope to know the effects of the 2013 wreck at this colony. More than half the corpses aged from their bill characters were of breeding age so adult survival is likely to be lower than normal. However, whether this will result in a measurable decrease in numbers breeding is unclear. After the 1983 wreck, overwinter survival of Puffins on the Isle of May was reduced, but this did not result in a demonstrable reduction in breeding numbers. In the 1980s the population was increasing rapidly so there were sufficient non-breeders to make good the losses. However, the Isle of May population is no longer increasing so it remains to be seen whether it is sufficiently resilient to cope with this wreck or whether breeding numbers will decline.

(Contributed by Mike Harris & Sarah Wanless, CEH; e-mail mph@ceh.ac.uk*)*

Therese Alpamo/SNH

151. Mike Harris with some of the casualties of the Puffin *Fratercula arctica* wreck of March 2013.

For extended versions of many of the stories featured here, and much more, visit our website www.britishbirds.co.uk

BB Grant to the World Land Trust

A *BB* grant of £1,000 has been awarded to the World Land Trust for use in Armenia. It will be passed to the Foundation for the Preservation of Wildlife and Cultural Assets (FPWC) in the Khosrov IBA Buffer Zone Reserve. This Important Bird Area has no fewer than 21 species of breeding raptors, including Lammergeier *Gypaetus barbatus*, Eurasian Black *Aegypius monachus* and Egyptian Vultures *Neophron percnopterus*, Short-toed *Circaetus gallicus* and Lesser Spotted Eagles *Aquila pomarina*. It also holds some rare mammals, such as the Bezoar Ibex *Capra a. aegagrus* and Armenian Mouflon *Ovis orientalis gmelini*, but particularly the Caucasian Leopard *Panthera pardus saxicolor*.

FPWC has established the Caucasus Wildlife Refuge, where rangers are employed to help protect some of the rarest of the raptors in the region. In 2012, FPWC's rangers began a supplementary feeding programme for vultures. Many families in the local communities keep cattle and sheep so the rangers encourage them to donate dead livestock to place in the refuge for vultures. This programme has been a great success and one of the rangers, Hovik Asatryan, said of the entire Caucasus Wildlife Refuge project: 'This project is a very powerful tool for raising awareness of environmental issues and wildlife in our community. Well-informed people are more aware of the surrounding plants and animals. Now everyone in the community helps to protect our natural assets.'

Money goes further in Armenia than here, and our grant will go towards tree-planting to restore former logged areas, or to rangers' salaries, thereby helping to protect threatened species against illegal poaching and to fund feeding programmes like the one described above.

Liben Lark is Archer's Lark

The Critically Endangered Liben Lark *Heteromirafra sidamoensis* of southern Ethiopia – forecast as mainland Africa's first bird extinction of modern times – has been thrown a lifeline. Another population of *Heteromirafra* larks, discovered at Jijiga in northeast Ethiopia, 600 km from the Liben Plains, has been identified as 'Liben Larks' too.

The news was broken at last month's African Bird Club meeting in London by RSPB conservation scientist Dr Paul Donald. In a further twist to the tale, Paul confirmed that Archer's Lark *H. archeri*, described from Somalia by British ornithologist Geoffrey Archer in 1922, is *also* the same species. So the three populations of *Heteromirafra* lark in the Horn of Africa are all Liben Larks (formerly known as Sidamo Lark) and by the rules of zoological classification, the first scientific name ascribed to the species takes precedence, hence Liben Lark is now *H. archeri*.

The Jijiga larks were discovered by Rockjumper bird tour leader David Hoddinott in January 2011. A follow-up expedition to this remote region by a team from BirdLife confirmed that they were an outlier of the lark population now restricted to a tiny area of relict grassland near Yabello in southern Ethiopia, the Liben Plains, a population that may not exceed 100 individuals. It would appear that the lark was once widespread across the intervening grasslands between these two far-flung locations. The only other species in the *Heteromirafra* genus is Rudd's Lark *H. ruddi*, another Endangered species, found only on high-altitude grassland in South Africa. (These primitive larks may in fact be the basal clade for all other lark genera.)

While the story of Geoffrey Archer's lark is perhaps worthy of Jeffrey Archer, the ending may not be a happy one. Archer's Larks have not been recorded in modern times in what is now the very hazardous terrain of Somalia. And the Jijiga population is also in an insecure area on the Ethiopia/Somalia border and therefore impossible to monitor at present. The Liben Lark hangs on – and active conservation measures are being enacted on the Liben Plains, thanks to funding from the 2010 Birdfair – but the future for all populations of this enigmatic species remains precarious.

You can hear Paul Donald (and the other speakers at the April ABC meeting) talking to Charlie Moores on his website www.talkingnaturally.co.uk

Cantelo in Cadiz

Much like guide books, birding site guides can become outdated very rapidly as habitats and bird populations change. But the advent of online site guides that are regularly updated gives birders a far more dependable resource. A very good example is a guide to Cadiz province in southernmost Spain that Kent birder John Cantelo offers on his website http://birdingcadizprovince.weebly.com

John says: 'The book exists only in pdf form. Although it can be read with an e-reader, it is better viewed on a laptop or, once downloaded, in printed form. It is available in two versions – one with photos of many of the sites covered and the other with the same text, but without the photos (both are 100+ pages). I have also produced a short 17-page booklet on key birding sites in the area for those with limited time (or inclination). Although several people have asked me to pursue the idea of a 'proper' printed book, I have resisted this for several reasons. I would contend that keeping it in 'virtual' form allows it to be continuously updated, amended and revised in a way that a printed book can never match. Accordingly, I review and edit the guide two or three times a year. This is particularly useful in a bird site guide where circumstances change quickly and unpredictably.'

These excellent guides are free to download/print off but John asks that birders who use his detailed knowledge of this raptor-rich region consider making a donation to the RSPB, BirdLife or the Spanish BirdLife partner, SEO. John concludes: 'I hope that with my guide as an example, more birders might like to consider producing a guide to birding areas with which they are familiar.'

New County Recorders

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In praise of... Swifts

After a grim start to this spring with bitter easterly winds blowing until the second week of April, we should be enjoying warmer weather in May. And with it will have come a surge of summer migrants that were penned to the south coast of England for the first month of 'spring' 2013.

Perhaps the most mysterious is one of the last to arrive (and one of the first to leave), the Common Swift *Apus apus*. The UK's Swifts have one of the longest migration journeys in the world, 22,000 km (14,000 miles) every year, while they fly around 900 km (or more) every day during the nesting season. By sleeping with half of its brain at a time, the Swift lives a perpetually aerial life, coming down only for a short period each year to breed. One Swallow *Hirundo rustica* doesn't make a summer but flocks of screaming Swifts scything through the sky on a May evening certainly suggest that summer is just around the corner. More than the return of any other migrants from Africa, the arrival of Swifts is life-affirming proof that the grip of winter has gone. For now.

152. Common Swifts *Apus apus*.

Roger Tidman/FLPA

The changing status of the Great White Egret in Britain

Chas Holt

Abstract Records of the Great White Egret *Ardea alba* have increased significantly in Britain in the last 20 years. The species now occurs throughout the year in some parts of the country, and is sufficiently numerous for a population trend based on WeBS Core Counts to be produced. The source of the increase is probably the expanding populations in neighbouring countries, particularly the Netherlands – where there is now an established breeding population and 2,000+ wintering individuals – and France. The species' habitat requirements are reviewed in relation to research findings from the Netherlands and elsewhere, which may be relevant to the continued expansion of the British population. Following successful breeding by Great White Egrets on the Somerset Levels in 2012, further breeding attempts in Britain are likely, especially in response to appropriate wetland habitat creation and sympathetic management, and particularly through landscape-scale initiatives.

Introduction

The Great White Egret *Ardea alba* has a worldwide distribution, covering large parts of Europe, Asia, Africa and the Americas (with some authorities splitting the New Zealand/southeast Asian form *modesta* from nominate *alba*). Across much of southern Europe, the species is widespread but patchily distributed as a breeding bird, although European birds account for only a small proportion of the world population. Temperate breeders nest between April and July and, within the core part of the range, the species typically nests in colonies of up to 1,000 pairs, although in some populations there is a tendency to breed solitarily or in small groups (Cramp & Simmons 1977; del Hoyo *et al.* 1992; Kushlan & Hancock 2005). The most recent estimate of the European breeding population is c. 24,000 pairs (BirdLife International 2004), when positive trends were evident across most of the range. Since then, the species' fortunes in Europe have varied, with populations in the north and west of the range faring better than those in traditional core areas (Klaassen 2012).

Outside the breeding season, Great White Egrets may feed singly, or in small, loose groups, although flocks of 100+ may occur in core areas where food is abundant. The species is a diurnal feeder, most active at dawn and dusk, although in coastal environments its feeding patterns are tide-related. Night roosts form in trees alongside standing water or rivers, or in wet woodland, often in association with other herons (del Hoyo *et al.* 1992; Kushlan & Hancock 2005). In Europe, the species has traditionally been at least partly migratory, spending the non-breeding period around the Mediterranean Sea, Red Sea and Persian Gulf. More recently there has been an increasing trend towards wintering farther north (Vogrin 1999; Klaassen 2012). The most recent winter trend for the species in the African–Eurasian region as a whole suggested a population increase of 3.9% per year (for the period 1989–2006; http://wpe.wetlands.org).

This paper reviews the changing status and distribution of the Great White Egret in Britain. It also covers the species' habitat requirements, the movements of marked individuals, and discusses the prospects of a regular British breeding population becoming established.

153. Great White Egret *Ardea alba* and Little Egret *Egretta garzetta*, Meare Heath, Somerset, March 2011. To what extent will the Great White replicate the expansion of the Little Egret across lowland England in the next decade or two?

Jeff Hazell

British status

There is no evidence that Great White Egrets bred in Britain historically, and the first documented occurrence was of a single bird present for 'several weeks in winter' at Hornsea, Yorkshire, in 1821 (Naylor 1996). That was followed by a further six records during the nineteenth century (including two in Scotland and two additional records in Yorkshire) but then no documented records until September 1948 when one spent three weeks in Cornwall. Another in Cornwall in 1951 preceded another long spell with no records, before a small influx of four birds in 1974 and two in 1977, after which the species became virtually annual. There was a marked increase in the number of records from the start of the 1990s and the Great White Egret ceased to be considered as a national rarity at the beginning of 2006 (Fraser *et al.* 2007).

Records submitted to BirdTrack (www.birdtrack.net) since the beginning of 2006 (which incorporate submissions to BirdGuides www.birdguides.com) show that the number of Great White Egrets recorded annually in Britain has continued to increase (fig. 1). By calculating the five-year means of BirdTrack records from 10-km squares during the period 2006–11, Musgrove *et al.* (2013) estimated an average winter population of 34 Great White Egrets in Britain (and one in Northern Ireland).

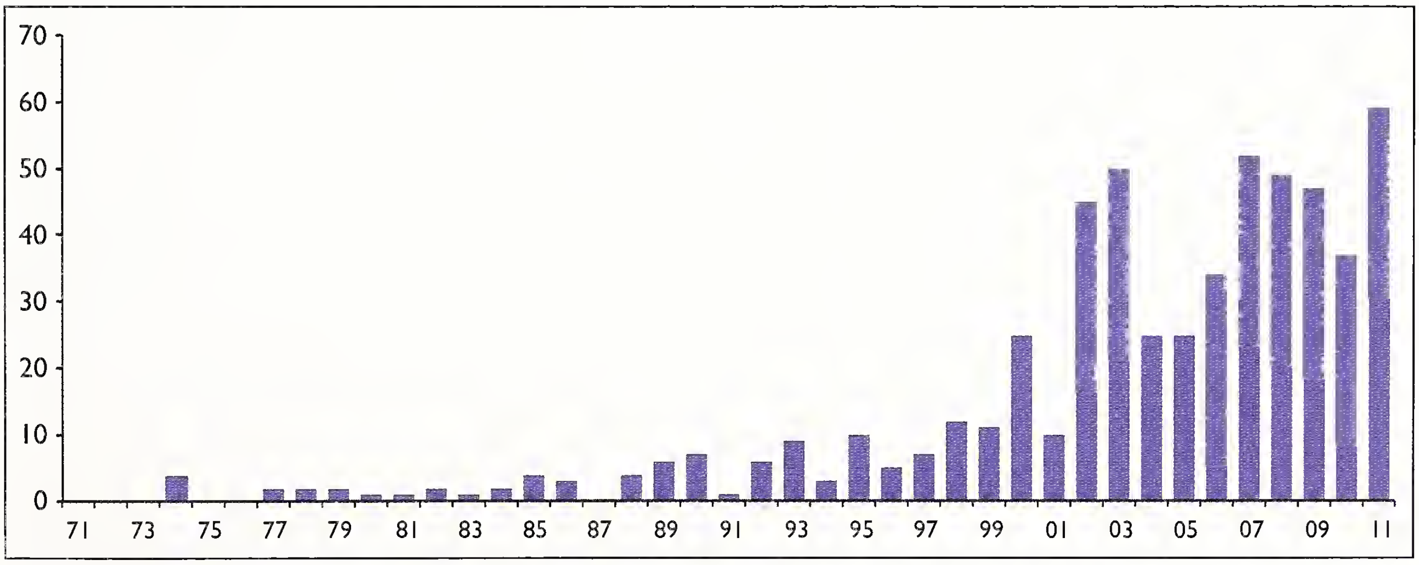

Fig. 1. Annual totals of Great White Egrets in Britain. Those for 1971–2005 are based on BBRC data, those for 2006–11 on submissions to BirdGuides/BirdTrack. Records since January 2006 have been rationalised to remove obvious duplication. Note that records since 2006 have not been formally submitted or assessed.

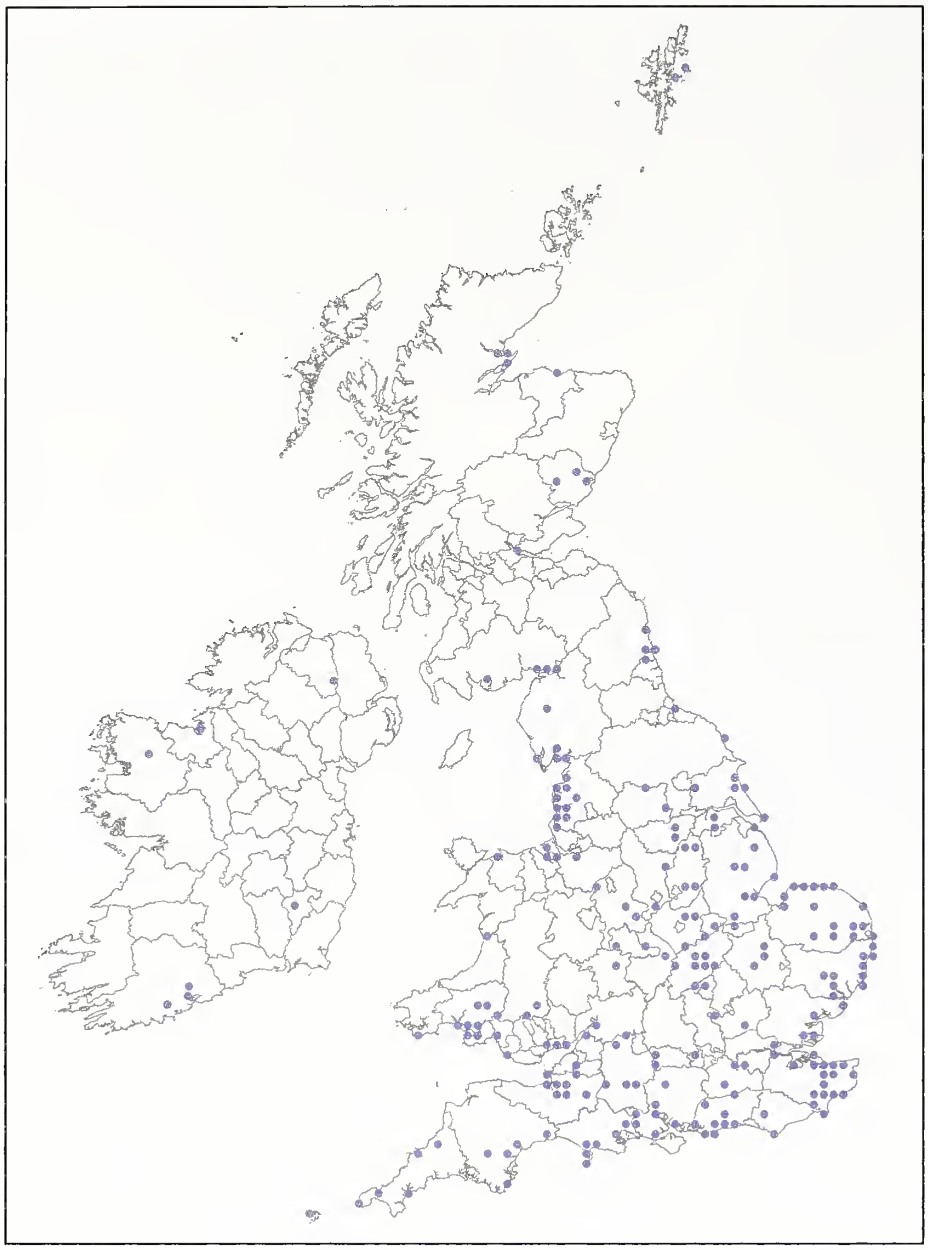

Fig. 2. Distribution of BirdTrack records of Great White Egrets in Britain and Ireland in 2012 by 10-km square (and using county boundaries from the BirdTrack database).

Geographical distribution

During the BBRC period, the 301 accepted records of Great White Egrets were distributed across Britain. Favoured counties were Norfolk (36 records), Sussex (26), Yorkshire (26), Dorset (23), Kent (22) and Suffolk (20). The species' tendency to use a wide variety of wetland habitats and also to move away from the coast is evident in the returns from landlocked counties such as Cambridgeshire, Leicestershire and Northamptonshire, all of which have 10+ records.

Since January 2006, Great White Egrets have continued to turn up throughout Britain, particularly in England and Wales. BirdTrack records in 2012 (fig. 2) indicate several hotspots for the species, including northwest England, Kent and the Severn catchment, all areas where a small number of individuals appear to be resident. This distribution matches the results from

Roger Riddington

154. Great White Egret is a realistic target for birders anywhere in the UK, including landlocked counties and remote islands; Whalsay, Shetland, November 2011.

Rob Belterman

155. Anecdotal evidence suggests that Great White Egrets may cope better with frozen conditions than Little Egrets, which are known to be susceptible to severe winters; the Netherlands, December 2010.

Bird Atlas 2007–11 (Balmer *et al.* in prep.); considering that Great White Egret did not feature in the previous breeding atlas (Gibbons *et al.* 1993) and that just a single bird was seen during the last winter atlas period (Lack 1986), this emphasises the rapid spread of the species.

A small number of records, particularly in the autumn from western extremities such as the Outer Hebrides (and Ireland; fig. 2), could conceivably relate to birds of the North American form *egretta*, which is recognised as a separate subspecies (e.g. Sheldon 1987). A number of Great White Egrets have been reported from the Azores, and of course there are several records of other Nearctic herons in the UK, all of which suggests that a Great White Egret is capable of crossing the Atlantic successfully.

Seasonal distribution: increasing winter population

At the same time as the number of records of Great White Egret in Britain has increased, the seasonal pattern has altered. When the species was an extreme rarity in Britain, virtually all records were of single birds in spring or summer. These were probably overshooting spring migrants or perhaps nomadic individuals prospecting from continental Europe during midsummer. However, in the early 1990s it was notable that a majority of records were from the autumn period. At least in part, this may have represented post-breeding dispersal of birds from France, since it coincided with a sharp increase in the French breeding population (Marion 2009). Since 2000, the winter months have become the peak period for British records. Prior to the 1990s, birders in Britain were at least six times more likely to see a Great White Egret in spring than between October and March, but that situation has now reversed and records during the non-breeding period predominate (fig. 3). It is becoming increasingly difficult to rationalise BirdTrack records to remove duplication, but it is clear that this general trend has been maintained since 2010, with the proportion of records during the

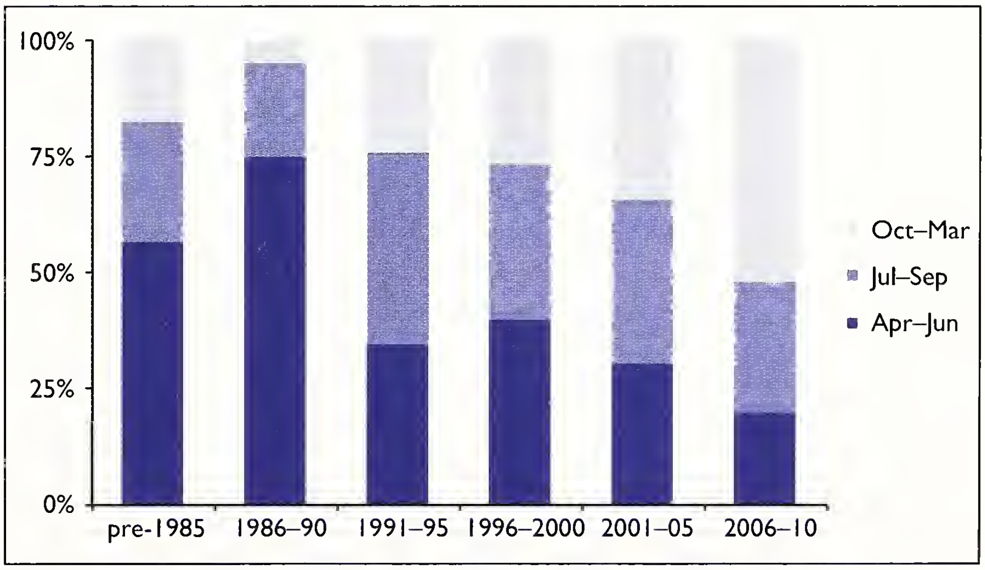

Fig. 3. Seasonal distribution of Great White Egrets in Britain: all pre-1985 records are shown together, subsequent records in five-year periods. All records up to and including 2005 are based on BBRC data; those from 2006 onwards are based on submissions to BirdGuides and BirdTrack (after rationalisation to remove duplication).

October to March period having risen to at least two-thirds.

These changes have been associated with a growing number of Great White Egrets using inland wetlands and the adjacent agricultural hinterland during winter, a habitat combination that characterises areas such as the Somerset Levels and East Anglian fenland. A number of other areas in Britain, such as northwest Lancashire, the north Norfolk coast, and southeast Kent, have also supported multiple records of the species in recent winters. A similar shift in seasonal distribution characterised the expansion of the Little Egret *Egretta garzetta* in Britain during the 1990s (Musgrove 2002; Holt *et al.* 2012) and also, more recently, other herons in Britain, such as Glossy Ibis *Plegadis falcinellus* and Cattle Egret *Bubulcus ibis.*

Great White Egrets from the traditional European breeding range (in countries such as Austria and Hungary) tend to migrate south in winter, but ringing data show that birds from newer breeding populations, such as those in France, tend to winter at approximately the same latitudes (although sometimes seeking milder conditions on the continent's western seaboard; Klaassen 2012). Britain is thus well positioned to receive any future influxes of continental birds linked to severe weather movements, bolstering an already increasing resident population.

The indices shown for Great White Egret (fig. 4) are based on WeBS data from the months of October to March inclusive, for the period 1995/96 to 2010/11. WeBS coverage is far more extensive during winter than summer, and these data indicate a particularly marked increase since the winter of 2008/09, matching the pattern shown by winter records nationally (fig. 3). The trajectory of the WeBS trend somewhat resembles that shown by the Little Egret during the early years of that species' population increase in Britain; could the Great White Egret continue to increase at a similarly rapid rate?

BOX 1

A WeBS trend for the winter population of British Great White Egrets.

The Wetland Bird Survey (WeBS) is the monitoring scheme for non-breeding waterbirds in the UK, and data collected by volunteers at a range of wetland sites are analysed to produce annual indices and associated population trends (e.g. Holt *et al.* 2012). In winter, the Great White Egret is now recorded in sufficient numbers during monthly WeBS Core Counts to allow a trend for the wintering population to be produced. This trend is published here for the first time (fig. 4).

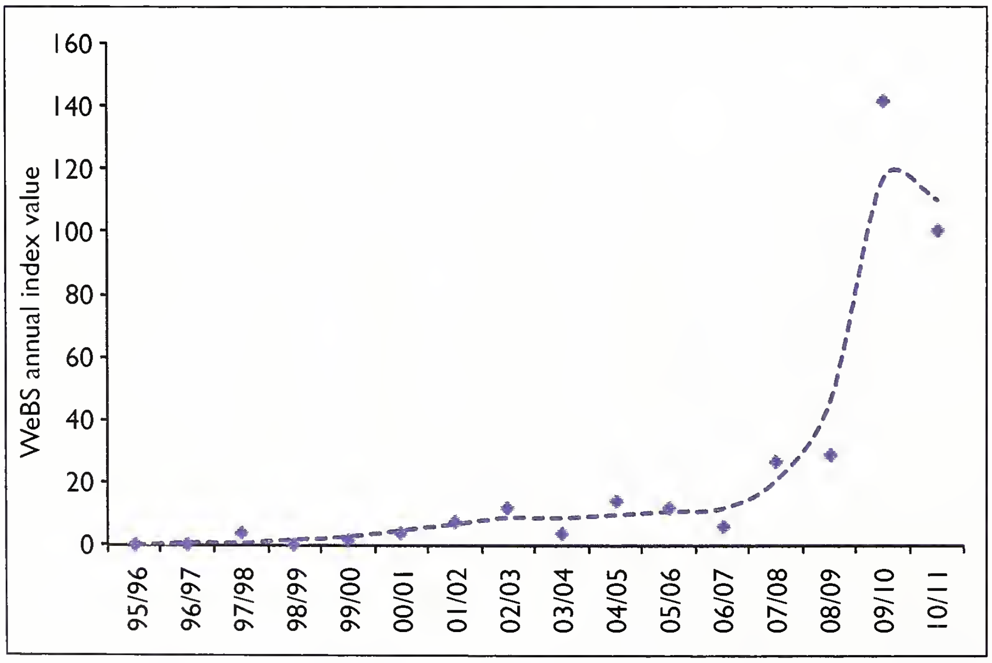

Fig. 4. WeBS annual indices and associated winter population trend (dotted line) for Great White Egret in Britain.

Trends elsewhere in Europe

The current trend shown by the Great White Egret in Britain appears to be strongly associated with increasing numbers in other, relatively new northwest European populations, such as those in the Netherlands and France (fig. 5). In France, midwinter numbers approximately doubled during the three-year period 2009/10 to 2011/12 (per Wetlands International). Other increases have been observed in Belgium and the Iberian Peninsula (almost 1,500 Great White Egrets were estimated in Spain in 2010/11; J. R. Garrido *in litt.*). However, although numbers have also risen in parts of central Europe, such as Switzerland and

Neil Calbrade

156. Research has shown that the diet of Great White Egrets can vary considerably during the year. In the Netherlands, aquatic-based foraging (mainly for fish and amphibians) in the breeding season was replaced by a more terrestrial-based diet in winter (principally Common Voles *Microtus arvalis* in grassland); Camargue, France, May 2010.

Bulgaria (per Wetlands International), recent declines have occurred in some traditional core areas such as Austria and Hungary (Klaassen 2012).

It seems likely that contributory factors to the expanding populations in northwest Europe include increasing northwesterly post-breeding dispersal, a run of relatively mild winters during the 1990s and 2000s (which improved overwinter survival), and greater protection from persecution as a result of the EC Birds Directive. Similar factors were also thought to have been important in the expansion of the Little Egret population in Britain and other parts of northwest Europe (Lock & Cook 1998); Little Egrets, like many other herons, tend to suffer particularly badly during very cold winters (Musgrove 2002; Voisin *et al.* 2005).

Comparing the status of the Great White

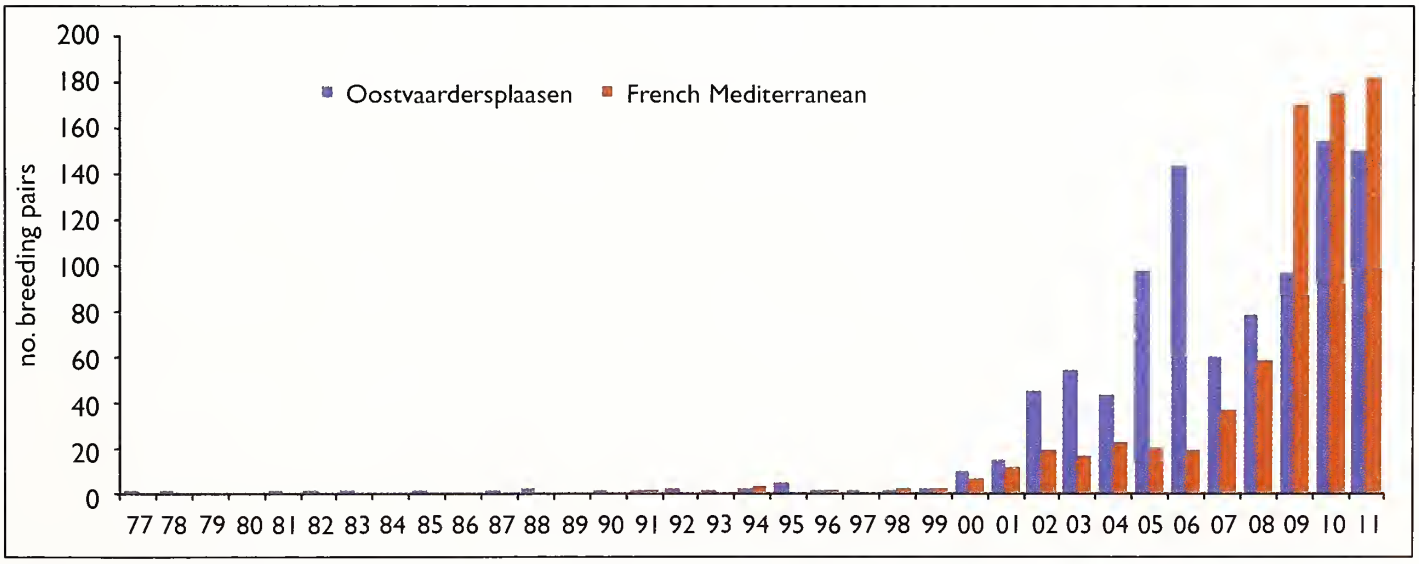

Fig. 5. The growth in breeding populations of Great White Egrets at Oostvaardersplaasen (the Netherlands) and on the Mediterranean coast of France, 1977–2011. Data provided by Menno Hornman (SOVON, Dutch Centre for Field Ornithology) and Michel Gauthier-Clerc (Tour du Valat research centre, France), respectively.

Egret in the Netherlands with that in Britain is particularly relevant. The species was considered a rare vagrant in the Netherlands until the 1970s, but a Dutch breeding population has now established, largely concentrated within a core area of Oostvaardersplaasen. Numbers there reached a peak of 143 pairs in 2006, before a period of drought resulted in a decline to 60 pairs in 2007. By 2010 and 2011, however, numbers had recovered to 150 pairs or more (fig. 5). Away from Oostvaardersplaasen, a single site in Overijssel province has also supported small breeding numbers during the last decade, with a maximum of eight pairs present (Boele *et al.* in prep.).

It is the growth of the Dutch wintering population which is particularly staggering, however. This increased to 2,300–2,800 birds by 2010/11, with the principal source considered to be the French breeding population, but also populations to the east such as in Poland, Belarus and Ukraine (Klaassen 2012). Interestingly, Little Egrets remain relatively scarce in the Netherlands (Hornman *et al.* 2012), where the species has increased far more slowly than in the UK, and Dutch birders tend to be considerably more familiar with the sight of a Great White Egret than of its smaller cousin.

The origins and movements of Great White Egrets in Britain

All 12 colour-ringed Great White Egrets seen in Britain in recent years originated in France (Robinson & Clark 2012). This pattern matches that in the Netherlands, where an increasing number of colour-ringed birds are mostly of French origin, with a secondary source of Polish birds, the latter probably representing westward movements of birds in winter (Klaassen 2012). It seems reasonable to assume that some of the Great White Egrets seen in Britain, particularly new arrivals in autumn and winter, originate from the Dutch population (where, as yet, there is no colour-marking programme; B. Voslamber pers. comm.). A group of eight Great White Egrets passing along the north Norfolk coast on 14th October 2009 could be taken as anecdotal support for this theory (plate 157).

Studies in North America have shown that mortality rates of first-year and adult Great White Egrets are about 76% and 26% respectively, and local populations of this generally long-lived species (the longevity record is 22 years) are thus not strongly dependent on reproductive success, in the short term at least (Pratt & Winckler 1985; Kushlan & Hancock 2005). European populations may differ somewhat from those in North America, but it is reasonable to assume that mortality is likely to be relatively high in the first year, reflecting difficulties in learning to forage successfully and also the inherent risks of migration and dispersal, and much lower thereafter (Kushlan & Hancock 2005). These characteristics of a species' population dynamics have implications for the potential colonisation of new areas – which may prove enlightening as the Great White Egret establishes itself in Britain.

Two French-ringed birds have proved to be long-stayers in Britain. CA62372, ringed at Lac de Grand-Lieu (near Nantes) in April 2004, was seen at Sturminster Marshall Gravel-

Alex Lees

157. This group of eight Great White Egrets was seen on the Norfolk coast on 14th October 2009, and presumably originated from the near continent. First seen approaching from the southwest at Cley, the flock continued east along the coast and was also seen at Sheringham and Mundesley. It is tempting to speculate that the group had made a foray across the North Sea from the Netherlands.

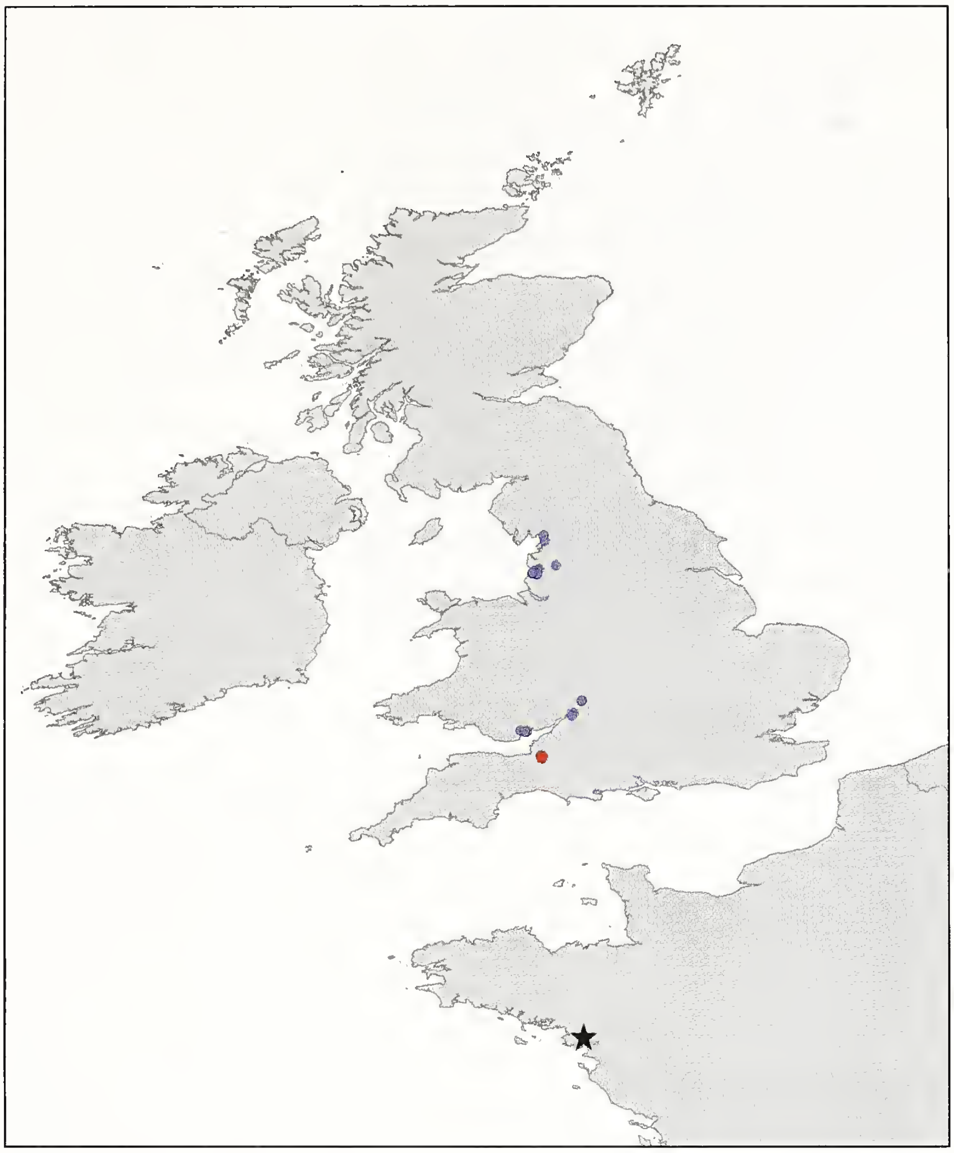

Fig. 6. The pattern of settlement by CA69229 at Shapwick Heath, Somerset (red dot), where it bred in 2012. Hatched near Besne (black star) in 2009, it was subsequently seen in northwest England, south Wales and Gloucestershire (blue dots) before being seen first on the Somerset Levels in 2010 (plate 160).

pits in Dorset four months later and returned to winter on the Dorset/Hampshire border each year until 2008/09, favouring Blashford Lakes and the adjacent Avon Valley. CA69229 originated from Besne (near Briere), and was seen at several sites in western Britain from Lancashire to South Wales and Somerset (where it bred in 2012). This bird's eventual settlement in Somerset is a good example of the potential for establishment of a new subpopulation following first-year dispersal (fig. 6). At such times, during late summer and autumn, first-years are particularly liable to roam and explore new areas

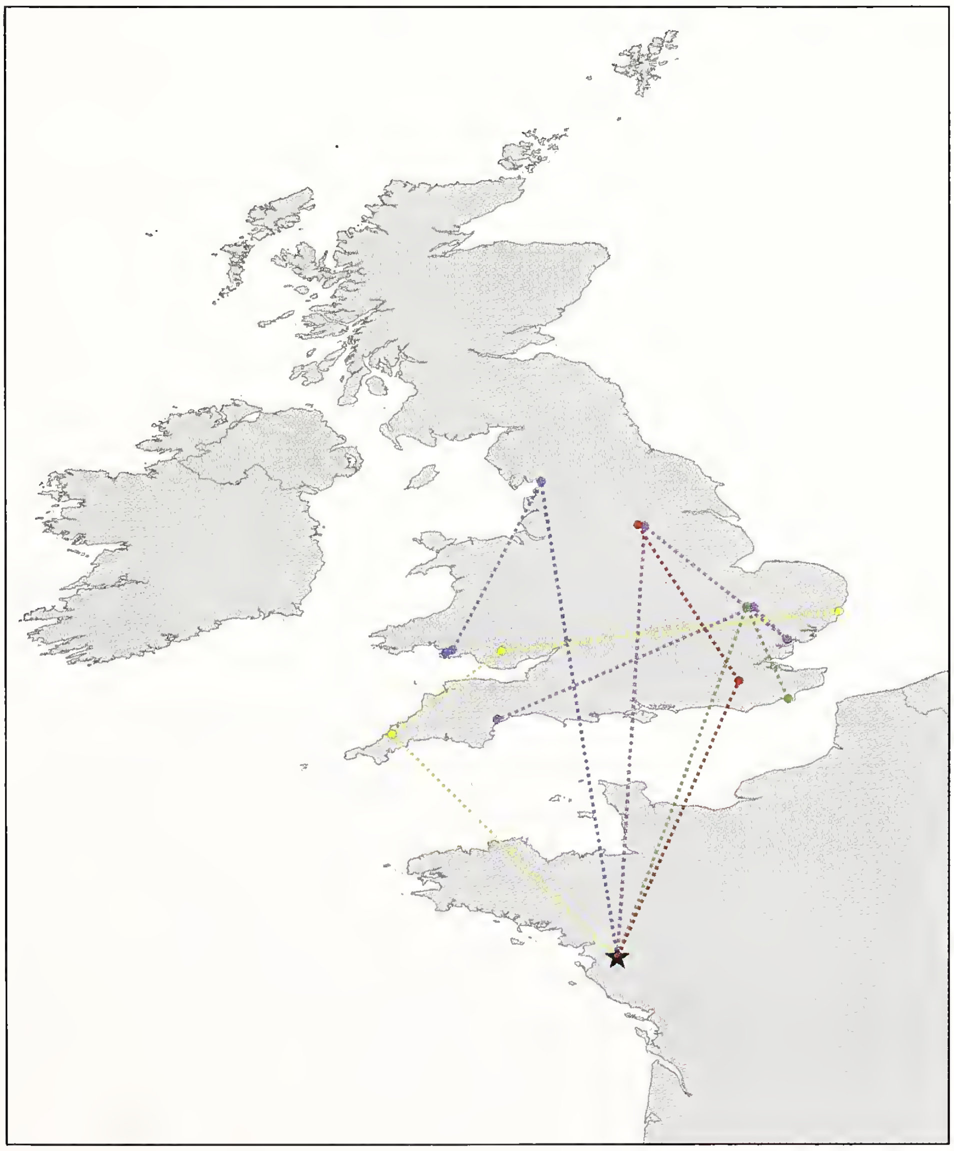

Fig. 7. Autumn movements of first-year Great White Egrets. The sequential sightings of five marked individuals are shown, all of which were hatched near Nantes in the period 2001–04. These examples of post-breeding dispersal also show the tendency for Great White Egrets to use regular sites in the UK: the Yorkshire Ings (red, purple) and the Ouse Washes (green, purple) were both visited by two of the birds shown here. Note also the similarity between the general movement and sites used by the bird denoted by the blue line and the individual shown in fig. 6.

158. It has become increasingly common in the Netherlands to see Great White Egrets on farmland during winter, often in areas used by flocks of wintering geese (as here with these European White-fronted Geese *Anser a. albifrons* in November 2012). It is well known that Cattle Egrets *Bubulcus ibis* associate with grazing livestock, foraging mainly on disturbed insects, but an association between Cattle Egrets and geese has also been documented. Now that Great White Egrets and flocks of geese are sharing farmland habitats in northwest Europe in winter, perhaps similar behaviour is evolving in the Great White Egret?

and the movements of five such individuals are shown in fig. 7. The population dynamics of the northwest European population of Great White Egrets certainly merits further investigation, and this could be achieved by an expansion of colour-ringing schemes across the breeding range, building on the work at colonies in France, particularly Lac de Grande Lieu and Besne.

Habitat selection: lessons from the Netherlands

Although there are different approaches to habitat creation and management in the Netherlands, the obvious similarities in terms of latitude, climate and general land-use patterns mean that waterbird trends and associated habitat issues in that country may be especially relevant for assessing the prospects of particular species in Britain (e.g. Pearce-Higgins *et al.* 2011, Ausden *et al.* 2013). Voslamber *et al.* (2010) described how the increase in Great White Egrets in the Netherlands can be attributed largely to the creation of an expansive new wetland, Oostvaardersplaasen, which has increased the availability of shallow marshland in particular. The most important factor was the creation of a combination of clear, shallow freshwater pools and inundated grasslands within an area that was formerly the dry border zone. Furthermore, this new foraging habitat was situated close to undisturbed breeding sites. From March to July, Great White Egrets preferentially foraged in ditches at Oostvaardersplassen, where the main prey items were Three-spined Sticklebacks *Gasterosteus aculeatus*, other small fish and tadpoles. During the autumn, most aquatic foraging took place along reedy borders of shallow pools, after which a switch in foraging behaviour was evident with drier

BOX 2

Habitat features of inland wetlands that will be important for the colonisation of new species in Britain.

As part of a study reviewing the potential implications of climate change for the UK's network of SPAs (Special Protection Areas), Pearce-Higgins *et al.* (2011) summarised habitat features of inland wetlands that will be of importance for species predicted to colonise the UK, including Great White Egret:

- wet and dry reedbeds, including ditches and pools, adjacent to patches of wet scrub and wet woodland;
- extensive areas of shallow, open water (including some early successional edge habitats) containing high densities of small fish and invertebrates;
- a mix of winter and spring grassland, both flooded and unflooded.

grassland within areas of farmland being used increasingly during the winter. This switch to land-based foraging, which has become particularly noticeable in the Netherlands as the winter population of Great White Egrets has increased (M. Hornman pers. comm.), tends to be associated with a change in diet, with Common Voles *Microtus arvalis* an important prey item. Equivalent research on habitat selection and prey intake by Great White Egrets has not been carried out in Britain, but the potential availability of suitable seasonal foraging areas may prove to be a key factor in determining the rate of expansion of a resident population in Britain, as well as the potential productivity of associated breeding attempts.

The Somerset Levels

In view of the habitat requirements of Great White Egrets, the Somerset Levels offer probably the most extensive area of suitable habitat for the species in Britain. At a landscape scale, the Somerset Levels is a heterogeneous mix of habitat types, including open wetland, reedbed, grazing marsh and drier pastoral farmland. In addition, this combination of habitats is close to the Severn Estuary, which could potentially offer additional resources, particularly during winter when other areas are frozen. A small number of Great White Egrets has become a feature of the Somerset Levels in recent years (Gibbs 2012), and it perhaps came as no great surprise that in 2012, following summering by a small number of egrets at the site in preceding years, Shapwick Heath proved to be the location of the first breeding in Britain. Two pairs fledged a total of four young (see Anderson *et al.* 2013).

Prospects for the future: Great White expectations

Predicted changes in climate are expected to be generally beneficial for the Great White Egret and, in view of the increase in records over the past 25 years, and in particular the recent winter trend and breeding activity, the future of the Great White Egret in Britain looks positive. The population in southern Britain might be expected to show a similar rate of increase to that seen (at a similar latitude) in the Netherlands in recent years, although requirements for extensive areas of suitable habitat could limit the growth of a British breeding population. For that reason, it is perhaps doubtful that the Great White Egret will replicate the speed of population increase and range expansion shown by the Little Egret in Britain since 1990. The two species clearly differ in terms of habitat requirements and sensitivity to winter weather. The spread of the Little Egret across Britain stemmed from its establishment at estuaries on the south coast (Musgrove 2002), with first breeding in the same area (Lock & Cook 1998). The spread of birds to the east coast followed, then a slow increase across inland sites in central southern England. At the northern edge of the species' range, rates of increase that typified south-coast estuaries 15 years earlier are now apparent at estuaries in the northwest, such as Morecambe Bay and the Ribble (Holt *et al.* 2012). The increase in the wintering population of Little Egrets was aided by a run of very mild winters during the 1990s, and there are some indications that a recent run of three consecutive cold winters (particularly 2010/11, the coldest in the UK for 35 years) may have affected wintering populations in some parts of Britain (Holt 2012). It is questionable whether the Great White Egret would respond quite so strongly to changes in winter temperatures and likely that habitat availability, particularly during the breeding season, will be equally if not more important.

With a small pool of Great White Egrets now effectively resident, and successful breeding in 2012, the Somerset Levels seems set to be the key site for the species in Britain in the immediate future. However, landscape-scale conservation initiatives in other areas, including plans for significant creation and/or management of wetlands, are also likely to be beneficial. The potential for increased connectivity between marshland habitats in East Anglia as part of the Great Fen project (www.greatfen.org.uk) may prove especially important to Great White Egrets. The close proximity to continental Europe of the Dungeness peninsula in Kent means that it is an obvious location for continued development of a pool of birds, and potentially a site for future breeding attempts. Up to seven Great White Egrets

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159. A flock of Great White Egrets on the Somerset Levels, March 2013.

wintered in the Dungeness area in 2012/13.

Habitat managers at these and other sites should be aware of the possible need for conservation of feeding areas, which may include the requirement to manage hydrology, vegetation and potential disturbance. In such situations, the potential for research into seasonal variation in habitat use by Great White Egrets and associated changes in diet should be explored. If winter populations of Great White Egrets do continue to increase in Britain, it will be beneficial to set up co-ordinated roost counts at favoured sites. In the Netherlands, roost counts have exceeded the totals derived through standard waterbird counts by 32% on average during recent winters (Klaassen 2012), and a similar contrast was evident for Little Egrets in the UK during that species' increase (Musgrove 2002).

The Great White Egret, with its extensive global range, propensity for dispersal and relatively broad habitat requirements, is undeniably a successful heron. British records have increased markedly since the late 1990s, most notably in terms of the winter population. Following successful breeding at the Somerset Levels in 2012, further breeding attempts in Britain are likely, particularly given appropriate wetland habitat creation and sympathetic management. The availability of sufficiently extensive areas of marshy habitat for breeding in proximity to suitable seasonal foraging areas, potentially achievable through landscape-scale conservation initiatives, is likely to be the key determinant of the rate of expansion of the British breeding population.

Acknowledgments

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James Packer

160. Great White Egret CA69229, Somerset, December 2010. Ringed as a nestling in northern France in May 2009, this bird settled in Somerset in July 2010 and bred there in 2012 (see fig. 6 – and read the full story of events in Somerset in 2012 in the following paper).

Nesting behaviour of the first breeding Great White Egrets in Britain

Kevin Anderson, Simon Clarke and Roger Lucken

Ben Green

Abstract The first recorded breeding of Great White Egrets *Ardea alba* in Britain occurred at Shapwick Heath NNR, Somerset, in 2012. Breeding behaviour was first noticed at one site in early April and at a second site nearby in late May. The first of three chicks at nest 1 hatched on about 2nd May; all three chicks from this nest fledged, the first on 9th June. At nest 2, two chicks hatched, the first on about 2nd July, but only one fledged successfully. The nest-site, breeding behaviour, feeding rates and diet, and chick development are described.

The first recorded breeding of Great White Egrets *Ardea alba* in Britain occurred at Shapwick Heath NNR, Somerset, in 2012. Shapwick Heath is managed by Natural England (NE) and forms part of the Avalon Marshes complex. It is essentially an area of disused peat workings which has been converted to reedbed and shallow open water, interspersed with small areas of woodland and low scrub. Possible breeding behaviour was first recorded on 7th April 2012, when two adult birds were observed carrying twigs to a secluded site within the reedbed. This activity continued for several days and, following consultation between NE, RSPB and Somerset Ornithological Society (SOS), a 24-hour watch was initiated to protect the site from disturbance and to monitor activity. On 28th May, further apparent nest-building activity was recorded at a second site some 300 m away, and over the following days it became apparent that a second pair of adults had begun a nesting attempt. Ultimately, three young fledged successfully from the first nest while the second nest produced two chicks, one of which died prior to fledging.

Origins

At least four Great White Egrets had been present at Shapwick Heath and the adjacent Ham Wall reserve for two years prior to the nesting attempt. Two of these resident birds formed the first pair, one of which (CA69229) had been ringed as a nestling in Besne, near Briere in northern France, on 6th May 2009 (L. Marion pers. comm.). This individual had first been recorded in the UK in Lancashire in September 2009; it was seen subsequently at a number of sites before settling in the Shapwick Heath/Ham Wall area in July 2010 (see Holt 2013, fig. 6). It is less certain whether either member of the second pair had previously been resident in the area but the initial activity at the second nest-site involved at least three adults, one of which was also ringed. This was a sibling of the ringed bird from nest 1, but had not previously been resident in the area. This ringed bird, presumably a male, seemed to be in competition with an unringed bird for the attentions of the third. Ultimately, the two unringed birds formed a pair whilst the ringed bird left the area and was subsequently recorded on 5th July 2012 at the Camel estuary in Cornwall before later returning to the Shapwick Heath/Ham Wall area.

The breeding attempts

Nest-site

Nest 1 was built at ground level in a reedbed, close to a willow *Salix* bush and within 2 m of a dead branch that formed a convenient perch for the adults. This nest was c. 100 m from the nearest footpath but obscured by vegetation and inaccessible by virtue of surrounding water. In contrast, nest 2 was built about 3 m above ground in a bush on a small island, some 300 m from nest 1 and 150 m from the nearest path. Although more visible, this nest was also inaccessible and neither was subject to any significant disturbance. At both sites the adults continued to add twigs to the nest during the early stages of incubation and again after hatching (plate 161).

Breeding behaviour

Precise laying dates were difficult to determine since it was not possible to see into either of the nests. However, continuous incubation began at nest 1 in early April and at nest 2 in early June. Copulation between the adults at nest 2 was recorded on 3rd and 4th June and took place at the nest on both occasions.

At both nests, both adults participated in incubation duties. The usual pattern of behaviour was for one bird to remain on the nest for approximately 24 hours. During this time, its mate would attend the nest periodically, on average 2–3 times a day. Nest 1 was not visible from any accessible point and therefore activity during these visits could not be recorded but changeovers could be detected since one of the birds was ringed. At nest 2, an arrival was always marked by some form of greeting between the birds. Most frequently this involved synchronised neck-stretching with the bill pointing skywards. The arriving bird then appeared to regurgitate food into the nest for the sitting bird. At both nests it was common for the visiting bird to remain near the nest, sometimes for several hours, but more usually for 15–30 minutes before departing to feed nearby.

At nest 2, where direct observation was possible, the incubating bird remained sitting without any obvious signs of repositioning for many hours during the early stages of incubation, rising from the nest usually only when visited by its mate and then only for a few seconds. However, during 30th June to 1st July the adult would often rise and stand above the nest, peering into it for a few seconds before resuming incubation. This was presumed to be a response either to movement of the eggs or to the sounds made by the developing chicks.

Changeovers of incubating duties occurred mainly once a day, only occasionally twice a day. Most frequently, changeovers took place early in the morning, commonly 1–2 hours after dawn. At both nests, the relieved bird returned to the nest at least once, usually within 30 minutes of departure. Often, but not always, this return visit involved the presentation of twigs or reeds (and occasionally food) to the sitting bird and seemed to be an important part of the pair-bonding process.

Hatching dates were similarly difficult to determine precisely, again because it was not possible to see into either nest, but changes in the behaviour of the parents suggested that hatching occurred in the first few days of May

Mike Hannon

161. An adult Great White Egret approaching nest 1 at Shapwick Heath carrying nest material, April 2012.

at nest 1, with an increase in the frequency of feeding visits. Given that three chicks were produced from this nest, it seems most likely that hatching (and probably also egg-laying) occurred at daily intervals with an incubation period of approximately 26 days. At nest 2, incubation began in early June and changes in parental behaviour on 2nd July – the sitting bird more frequently rising from the nest and peering into it – suggested that the first chick hatched around this date, again following an incubation period of c. 26 days later. Similar behaviour on 4th July was thought to signify another chick hatching. This nest produced only two chicks, which may indicate that eggs were laid two days apart; although it is possible that three (or more) eggs were laid at daily intervals and that one or more failed to hatch.

Provisioning the young

Fig. 1 shows the frequency of recorded feeding visits to the nests after hatching. Both pairs of adults consistently hunted in the same areas on the reserves. On some occasions, hunting occurred in shallow, open water close to and between the two nest-sites and at other times on larger areas of open water, both on Shapwick Heath itself and on the adjacent Ham Wall reserve. On those

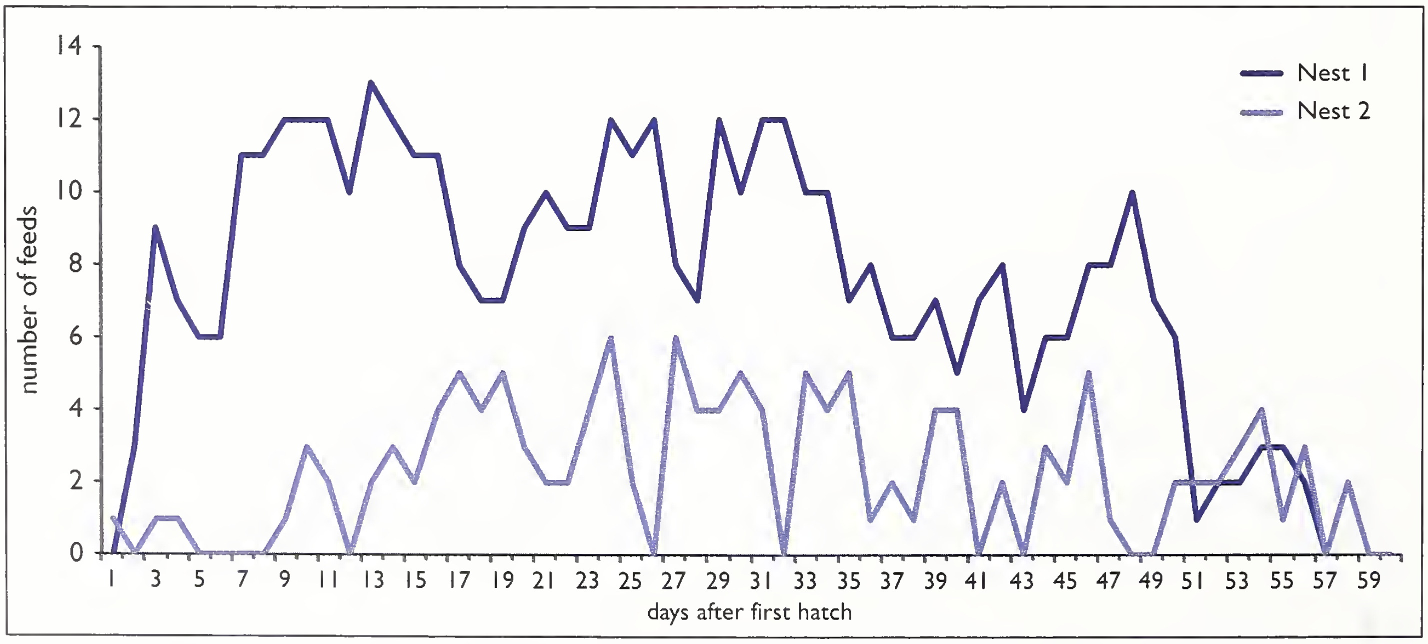

Fig. 1. Number of feeding visits per day by Great White Egrets to nests 1 & 2 at Shapwick Heath, Somerset, 2012.

occasions, when it was possible to observe hunting closely, prey consisted almost exclusively of small (c. 7–10 cm long) fish. For the most part the species were not identified, although it was very occasionally possible to distinguish what was either Rudd *Scardinius erythropthalmus* or Roach *Rutilus rutilus*.

Data on foraging habits from breeding Great White Egrets elsewhere in Europe suggests that the principal prey taken during the breeding period tends to be even smaller than recorded here, consisting mainly of fish species such as Three-spined Sticklebacks *Gasterosteus aculeatus* and tadpoles (Voslamber 2010). These apparent differences may simply reflect prey availability, since an audit of fish stocks on Shapwick Heath revealed six species of fish: Moderlieschen *Leucaspius delineatus*, perch *Perca*, Pike *Esox lucius*, Roach, Rudd and Tench *Tinca tinca* but an absence of Three-spined Sticklebacks and eels (Anguilliformes) (Droy 2009). In continental Europe, particularly during the (usually drier) post-breeding period, Great White Egrets are commonly recorded foraging in grassland and taking small mammal prey (*BWP*; Voslamber 2010). This might suggest that a more abundant and consistent aquatic food supply at Shapwick is a determining factor in the unexpectedly high productivity of the first two nesting attempts.

A clear difference in the frequency of feeding the juveniles was recorded at the two nests (fig. 1). The numbers of feeding visits recorded were determined by behaviour of the adults visiting the nest (visits to the nest were considered to be feeding visits when the adult spent several minutes on the nest and/or emerged from the nest to perch nearby and indulge in activities such as bill wiping, apparently cleaning the bill of regurgitated food; very brief visits, especially when a parent bird arrived shortly after a feeding visit by its partner, were considered not to constitute feeding visits). These frequencies may therefore not be completely accurate. Furthermore, on those occasions when no feeding visits were recorded at nest 2, this indicates gaps in observation rather than an absence of feeds. Nonetheless, there is still an obvious difference between the nests, with nest 1 receiving up to 13 visits a day while nest 2 never received more than six. The reasons for this difference are not clear. It seems likely that for both pairs this was their first nesting attempt, although the fact that the pair at nest 2 developed the bare-part coloration of breeding birds somewhat later than the nest 1 pair suggests that they were younger and less experienced. Weather conditions may also have played a part, since the post-hatching period at nest 2 was marked by heavy rain and high winds, which may have made feeding more difficult for the adults. In particular, some of the shallow areas used for foraging by the parents of nest 1 became flooded during the post-hatching period at nest 2, possibly forcing the parent birds to hunt farther afield.

Chick development

Whatever the reasons for the difference in provisioning rates, it is clear that development of the chicks at nest 1 was more rapid than at nest 2 (table 1). At nest 1, the chicks were first left unattended for short periods (<30 minutes) approximately eight days after

Table 1. Key development intervals of Great White Egret chicks at two nests at Shapwick Heath, 2012.

	Nest 1 Date	Estimated days from first hatch	Nest 2 Date	Estimated days from first hatch
Approx. hatch date	2 May	0	2 July	0
Young unattended for <30 mins	10 May	8	17 July	15
Young unattended for >2 hours	12 May	10	19 July	17
First wing-flapping	17 May	15	3 August	32
First movement from nest	23 May	21	22 August	51
First fledging	9 June	38	28 August	57
Independent feeding	18 June	47	2 September	62

the first hatching and for longer periods (>2 hours) within about ten days. In contrast, at nest 2, approximately 15 days elapsed between first hatching and the chicks being left unattended even for short periods although, as with nest 1, after a further two days the chicks were unattended for periods of two hours or more. Further evidence of the slower development at nest 2 was provided by differences in the estimated time to the first recorded wing-flapping, first movements of the young away from the nest and the fledging period (table 1). The interval between fledging and the first recorded instance of independent feeding by the young was actually shorter for nest 2 than for nest 1, perhaps indicating that food provisioning by the adults was the key factor in the slower development of the chicks at nest 2.

Within a few days of the young starting to feed independently, the frequency of visits by the parents of both broods decreased dramatically to an average of about two a day. However, the juveniles continued to visit their nest-sites and were observed making begging calls for several weeks thereafter. Occasional feeding of the young by the parents was recorded up to 12 weeks after hatching and this always occurred close to the original nest-site, even though the juveniles were by this time regularly flying considerable distances to feed. Foraging by the juveniles was initially confined to open-water areas around the nest-sites. This probably reflected a lack of sustained flying capability since the first foraging attempts were achieved by walking to open water. As their flight skills developed, the juveniles ventured to the other areas routinely used as hunting grounds by the adults and subsequently to other similar areas on adjacent land up to 1 km distant.

Discussion

In summary, the first breeding attempt (nest 1) was surprisingly successful. *BWP* states that the normal clutch size is 3–5 (2–6) eggs, but that from one colony in Hungary, the young reared per nest ranged from 1.13 to 3.06; fledging period is given as 42 days. The fact that the first pair to breed at Shapwick, almost certainly at their first breeding attempt, managed to raise three juveniles (plate 162), all of which fledged within approximately 38 days of hatching, suggests that both the habitat and the conditions were highly favourable.

At the second nest, two chicks hatched but

Mike Hannon

162. Three juvenile Great White Egrets adjacent to nest 1 watching an approaching Marsh Harrier *Circus aeruginosus*; 14th June 2012.

developed more slowly. Since the habitat was similar and the nest-site equally well protected from predators and disturbance, the reasons for this difference are not clear. Perhaps the adults at nest 2 were simply less skilled parents, or perhaps less clement weather conditions during the post-hatching period of that nest affected their foraging efficiency. Shortly after the first movement of the juveniles from nest 2, some aggression between the two chicks was recorded. Whether this aggression was a further reflection of competition for food is also unclear but the day after this behaviour was recorded one of the chicks had died and thereafter the rate of development of the remaining chick increased. The fledging period for the remaining chick was much longer than at nest 1 (57 days compared with 38 days), and significantly greater than the mean 42 days quoted by *BWP* and most other authorities. However, extended fledging periods have occasionally been reported from France, especially among pioneer populations (Kayser *et al.* 1994). The chick that died was lodged in the bush a little below the nest; it was recovered some time after nesting was complete and found to have a broken leg. This may have occurred during the observed aggression and prevented the injured bird from climbing back into the nest. On close examination, the nest seemed rather small to contain both juveniles securely; perhaps a further reflection of parental inexperience.

Initially, the principal reason for establishing a watch over these nests was to provide protection against the threat of egg-collectors and disturbance from over-enthusiastic observers and photographers. Over 3,500 people visited the site while the birds were breeding and over 2,000 hours of volunteer time was invested. Monitoring of the birds' behaviour was conducted in an unstructured manner and the detail recorded was entirely the decision of the individual observers. Nevertheless, useful data was collected and if, as hoped and anticipated, further nesting occurs in future years, it should be possible to develop a more structured monitoring programme. In particular, monitoring of foraging range and diet by both adults and juveniles may provide valuable data that could inform wetland conservation management and planning for the benefit of this and other members of the heron family.

Acknowledgments

The authors gratefully acknowledge the enthusiastic assistance provided by the large group of dedicated volunteers from NE, RSPB and SOS without whom protection of the nests and monitoring of behaviour would not have been possible. Special thanks go to Martin Sage, who first reported nest-building activity to NE, to Mike Hannon for providing the photographs accompanying this paper, to James Riall for assistance with data handling, and to Allan Drewitt, Ben Le Bas (NE) and Chas Holt (BTO) for their helpful comments and constructive review of the manuscript. Our thanks are also due to Loic Marion for providing information on the origin and history of the ringed birds.

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The breeding biology of the Common Buzzard

Robin Prytherch

Robin Prytherch

Abstract In a long-term study of the Common Buzzard *Buteo buteo* in Avon, territorial pairs were counted every year (1982–2012) and full breeding performance was recorded for 20 years (1988–2007), the main study period. The population rose from 13 pairs in 1982 to 105 pairs in 2012 (from 19 to 92 pairs during the main study period). Breeding output (from all pairs) declined from 1.89 to 0.56 chicks/pair but varied quite widely between years. Nearest neighbour distance and territory size also declined. A density-dependent effect on reproduction was clearly shown, while rainfall in May depressed productivity significantly. Territory size did not correlate with brood size but territories with more than 50% arable crops produced fewer chicks. Even though output declined as density increased, the number of chicks fledged per unit area increased, implying that high breeding density is better for the population overall but not for individual pairs. The study population was probably self-supporting throughout and latterly it appeared to produce more adults than it could absorb. Other studies are discussed with a view to determining the reasons behind the extraordinary increase in the national population of Common Buzzards. It is suggested that this increase, which started in the late 1970s, was partly attributable to legislation introduced about 15 years earlier for the protection of birds and a generally positive attitude towards raptors.

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This long-term study of the Common Buzzard *Buteo buteo* (hereafter simply 'Buzzard') began in 1982 and continues today. It involves a 75-km^2 study area in Avon, between Bristol and the Severn Estuary (fig. 1), in the Unitary Authority of North Somerset (part of the bird recording area of Avon). In each year I have mapped the territories of all pairs (13 in 1982, increasing to 105 in 2012), but between 1988 (19 pairs) and 2007 (92 pairs) I also recorded other aspects of breeding biology including all nest-sites and the number of chicks fledged. This paper concentrates on the results gathered during the main study period, 1988–2007.

Study area and methods

Habitat and landscape

The three predominant habitats in the study area are grassland, woodland, and arable land. The majority, almost 66%, is grassland, ranging from flower-rich wet meadows and unimproved meadows to improved grasslands. The meadows and fields are bordered or crossed by ditches and hedges with varying numbers of trees. Some of the hedges (in the flat valleys) are what I call 'wooded droves' – two parallel ditches, about 10 m apart, with the strip filled with trees of various species. Woodland covers 17% of the area, mostly deciduous with a sprinkling of conifers, the woodlands varying in size from 1 ha to over 60 ha (fig. 1). They are important hunting areas for Buzzards and contain most nest-sites. Arable fields cover up to 12% of the total area but vary somewhat from year to year. Only as stubble and after ploughing and reseeding are arable areas useful to Buzzards, when small invertebrate prey (chiefly earthworms, Lumbricidae) are available. Several villages, together with reservoirs and quarries, cover the remaining 5% of the area. All these components are set in a landscape comprising two wide valleys, ridges flanked with woodland and undulating country with many small valleys, with an altitudinal range 5–200 m above sea level.

Fieldwork

Details of the methods and time spent in the study area were given in Prytherch (2009). During the early part of the year, late winter to early spring, I visited all parts of the study area to check whether pairs were still present from the previous year and looked for the

Paul Hobson/FLPA

163. Adult Common Buzzard on fence post, Yorkshire, August 2008. Buzzards use posts as convenient lookouts for prey items and intruding conspecifics.

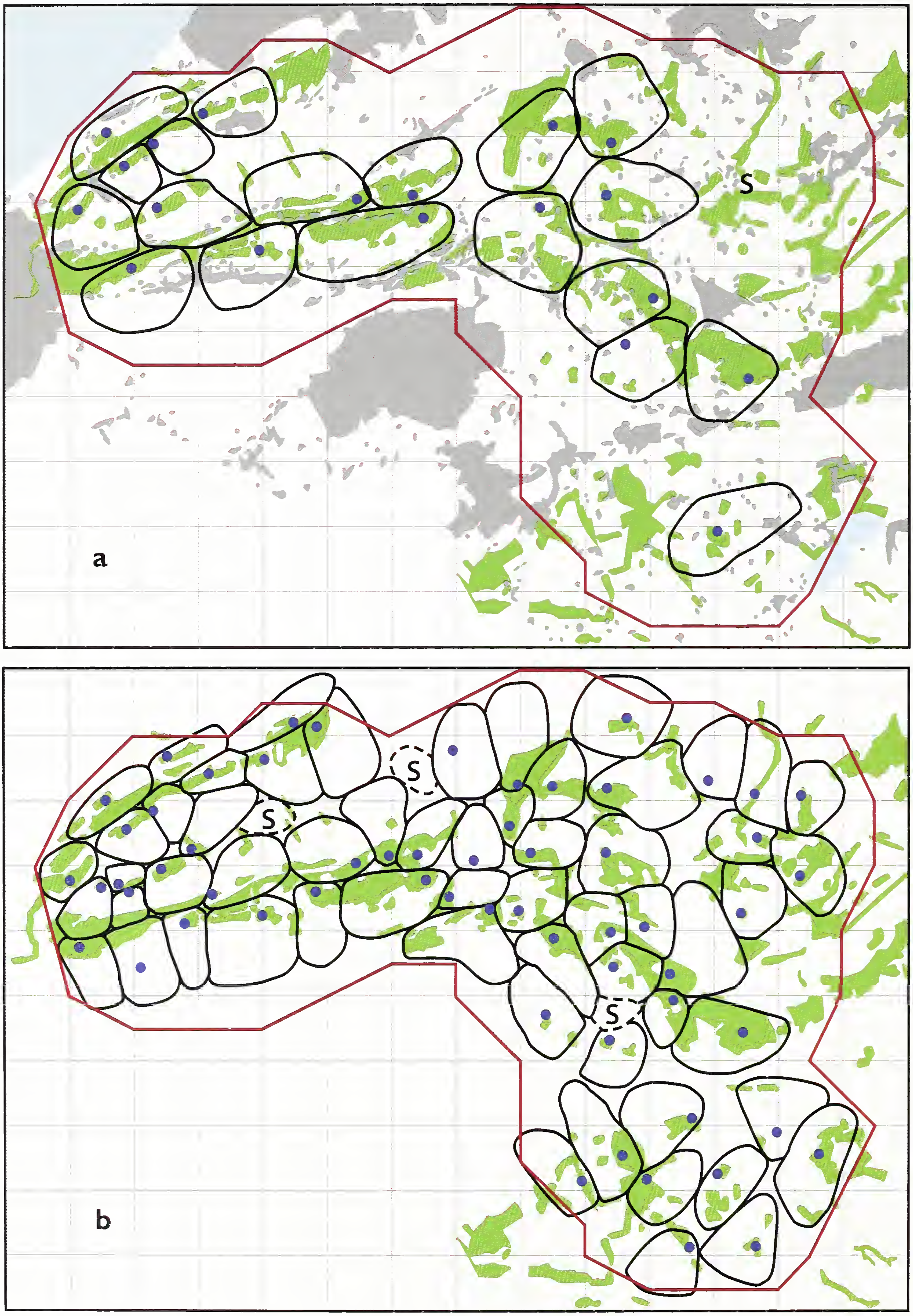


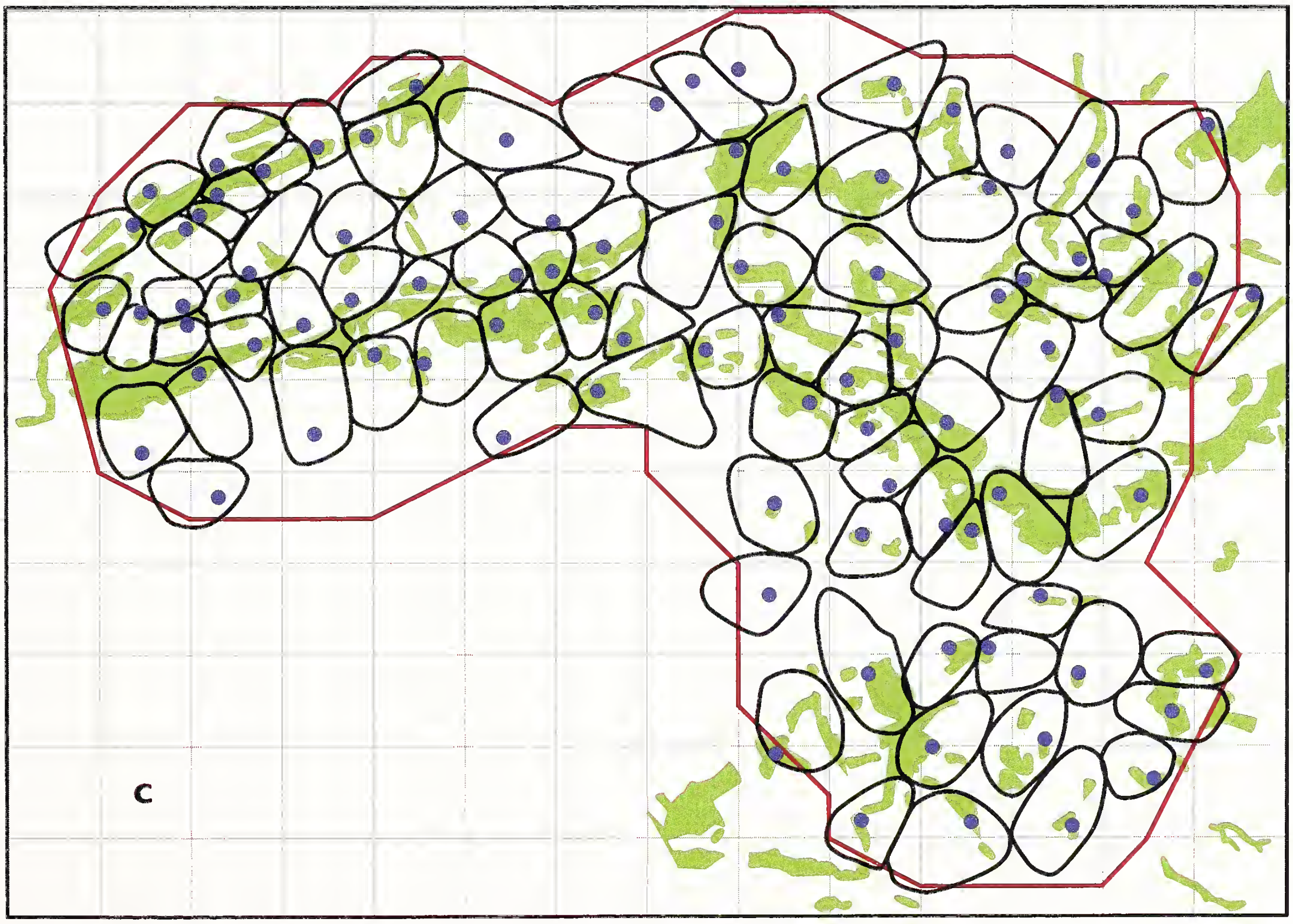
Fig. 1. a) The study area (outlined in red) enclosing 75 km^2, with the Severn Estuary and reservoirs in blue, woodland in green and built-up areas in grey. The grid shows 1-km squares. (The central urban area is Nailsea, with Clevedon to the west and Portishead to the northwest; the west edge of Bristol is just 2 km to the east, off the map.) The 19 occupied Common Buzzard territories for 1988, at the start of the main study, are shown. Nest-sites are indicated by blue dots. **b)** The 60 occupied territories in 1997, halfway through the study, with just the study area and woodland shown. S indicates single, unmated adults. **c)** The 92 occupied territories in 2007, at the end of the breeding study.

presence of new pairs. Using social behaviour as my guide (Prytherch 2009), I was able to map the territory limits each year. Some territories on the edge of the study area were included if more than half of the territory was in the study area (regardless of where the nest was). The nest-sites were not necessarily in the centre of the territory and were often close to one edge.

All food was taken from within the territory and no extra-territorial hunting was seen (*contra* Tubbs 1974). Later in the study, I was also able to use topography as an aid when I realised that this was an important element of Buzzard territories (see also below). From late February, but especially during March, I walked through the territories to search for nests. This involved checking any old nests and looking for new ones. Most established pairs had two or three nests and each year they repaired one or two of these or even built another new nest. After use the previous year, the nests become very flat-topped. The repaired nests, and new ones, have a rim of new twigs giving a broken edge to the nest, often with sprigs of greenery. Furthermore, there may be fluffs of white down on some twigs or adjacent branches, which are shed by the bird as it moves around the nest. Nevertheless, some nests were difficult to locate, for example in trees covered with Ivy *Hedera helix*.

In all the study territories (1,296 territory-years), the pairs built and/or repaired at least one nest every year. This held true on two occasions where a pair comprised an adult male and a first-year, then second-year female. A good nest was built/repaired in those years, even though the female showed no interest in it. I categorised these simply as two territory-years in which the pair failed. In almost all other cases, the nests were attended by females that appeared to be incubating. A few failed early where the nest deteriorated quickly during incubation.

The position of each nest was recorded with a grid reference, some with the aid of a GPS, and plotted on year maps to measure Nearest Neighbour Distance (NND). The tree species, height above ground and altitude were also noted. I also located the position of nests in territories just outside the study area to check whether they were a nearest neighbour to a pair in the study area. Further visits were made to each nest between mid May and mid June, to check which nest was in use, and then in June/July to check for nest success. I was rarely able to check clutch size as very



few of the nest trees were safe to climb. Later on, and especially after hatching, birds were more attached to the nest, although the reaction to my presence varied from exceptionally noisy calling and even mobbing to complete silence with no visual contact. I climbed to some nests, with help from colleagues, in order to ring the chicks.

In most cases I had to check the nests from the ground to establish the number of chicks. This was sometimes difficult because even large chicks can flatten themselves 'out of sight', especially if they hear their parents' alarm calls. Fortunately, once they are 3–4 weeks old, the chicks cannot resist wing-stretching or fidgeting in some other way. A single chick is usually in the centre of the nest and in a brood of two or three that's where one chick (presumably the dominant one) will be, with the other one or two pushed to the edge where they are more obvious.

The growing chicks void their excrement away from the nest so that adjacent branches are splattered with white, as is the ground below the nest. Generally, the more the splatter, the more chicks there are in the nest, but it is not a reliable guide (because of variation in the density of the shrub layer,

Table 1. The number of pairs of Common Buzzards recorded in the study area, 1982–2012. Data for the main study period (1988–2007) are shown in bold. Also shown for all years are the km^2/pair and density in pairs/100 km^2. Territory sizes (ha) are given for 1984–2007 with standard deviation (SD) plus minimum and maximum values. In all columns, the rapid change to the values is obvious. The overall min. and max. are shown in red. Over 30 years the increase in pairs was exactly 700%; for the main 20-year study period, 384%.

	pairs/ 75 km^2	km^2/ pair	equivalent pairs/100 km^2	territory size (ha) (mean, SD, min., max.)			
1982	13	5.8	17.3				
1983	16	4.7	21.3				
1984	17	4.4	22.7	132.0	-36.6	86	195
1985	17	4.4	22.7	134.0	-32.3	70	195
1986	18	4.2	24.0	137.0	-34.6	68	196
1987	19	3.9	25.3	131.0	-35.9	61	200
1988	**19**	**3.9**	**25.3**	**139.0**	**-36.0**	**57**	**195**
1989	**23**	**3.3**	**30.7**	**137.0**	**-38.2**	**60**	**195**
1990	**24**	**3.1**	**32.0**	**137.0**	**-37.4**	**56**	**205**
1991	**26**	**2.9**	**34.7**	**143.0**	**-37.2**	**61**	**212**
1992	**32**	**2.3**	**42.7**	**122.0**	**-34.4**	**48**	**195**
1993	**38**	**2.0**	**50.7**	**123.0**	**-35.4**	**63**	**201**
1994	**45**	**1.7**	**60.0**	**111.0**	**-40.3**	**36**	**233**
1995	**52**	**1.4**	**69.4**	**95.7**	**-35.3**	**22**	**195**
1996	**56**	**1.3**	**74.7**	**91.9**	**-36.9**	**22**	**204**
1997	**60**	**1.3**	**80.0**	**89.3**	**-31.6**	**22**	**148**
1998	**65**	**1.2**	**86.7**	**81.3**	**-29.3**	**22**	**155**
1999	**71**	**1.1**	**94.7**	**75.4**	**-27.3**	**22**	**153**
2000	**79**	**1.0**	**104.0**	**69.5**	**-26.1**	**22**	**135**
2001	**83**	**0.9**	**111.0**	**68.3**	**-27.8**	**22**	**159**
2002	**84**	**0.9**	**112.0**	**66.0**	**-25.2**	**22**	**144**
2003	**84**	**0.9**	**112.0**	**64.5**	**-24.3**	**22**	**130**
2004	**85**	**0.9**	**113.0**	**62.3**	**-20.1**	**22**	**112**
2005	**88**	**0.9**	**117.0**	**62.1**	**-21.4**	**22**	**124**
2006	**90**	**0.8**	**120.0**	**61.9**	**-20.9**	**22**	**117**
2007	**92**	**0.8**	**122.7**	**61.9**	**-20.3**	**18**	**116**
2008	97	0.8	129.3				
2009	99	0.8	132.0				
2010	103	0.7	137.3				
2011	103	0.7	137.3				
2012	105	0.7	140.0				

amount of rainfall, etc.). It is, however, a reliable clue that there is at least one chick above. I tried to check the nest when the chicks were c. 30 days old, after which they are highly unlikely to die before fledging (only one known case in my study). I would also check some territories soon after fledging to confirm/correct my estimate of the number of chicks.

The importance of topography

I define territories as the breeding unit for Buzzards. The territory is vital for a breeding pair of Buzzards, an area where, once settled, they spend the rest of their lives, apart from rare extra-territorial sorties as part of territory defence. The territory is defended throughout the year even if breeding is unsuccessful; only their young are tolerated in the territory, while all intruders are driven out. Mapping the territories revealed an important feature of almost all of them – their relationship to contours. The highest ground in a territory was usually at or near the edge and rarely near the centre (in only two of 92 territories in 2007). In simple terms, the ideal territory was in a valley, or on an escarpment (70 in 2007), not 'hanging' over a hill or ridge. Some territories are on slightly sloping (4) or apparently level ground (16). The reason for this is that since Buzzards spend most of their time near to ground level, this gives them the best opportunity to oversee all or most of their territory when hunting or engaged in other perched activities. They are thus well positioned to spot any intruding Buzzards in their territory.

Results

Population growth, breeding density and breeding success

The growth of the population varied from year to year initially, then increased by about 19% per year during 1992–95. The annual increase was then about 9% until 2000, after which it slowed to about 2%–3% (tables 1 & 2, figs. 1 & 2). Between 1988 and 2007 the population increased by 384% and between 1982 and 2011 by 700%. Fig. 1 shows the territory maps for three years, 1988 (19 pairs), 1997 (60) and 2007 (92), which demonstrates graphically how the territories shrunk during the 20 years.

Table 2. Breeding success of Common Buzzards in the study area, 1988–2007, plus means of Nearest Neighbour Distance (NND) data. See also fig. 2.

	no. pairs	chicks fledged per pair		NND in km (mean, SD, min., max.)			
		all	successful				
1988	19	1.89	2.12	0.97	0.50	0.47	2.37
1989	23	1.35	2.07	1.08	0.52	0.50	2.86
1990	24	1.58	2.00	1.06	0.53	0.31	2.86
1991	26	1.27	1.65	0.95	0.42	0.18	2.04
1992	32	1.25	1.74	0.89	0.24	0.52	1.30
1993	38	1.18	1.73	0.75	0.26	0.27	1.28
1994	45	1.02	1.53	0.77	0.27	0.38	1.91
1995	52	0.94	1.75	0.68	0.24	0.27	1.44
1996	56	1.05	1.64	0.65	0.31	0.12	1.39
1997	60	1.25	1.79	0.68	0.28	0.19	1.25
1998	65	0.68	1.63	0.67	0.25	0.23	1.35
1999	71	1.04	1.68	0.63	0.27	0.18	1.36
2000	79	0.73	1.26	0.59	0.27	0.18	1.3
2001	83	1.00	1.48	0.63	0.26	0.18	1.35
2002	84	0.61	1.34	0.61	0.27	0.12	1.33
2003	84	0.77	1.67	0.62	0.28	0.13	1.42
2004	85	1.26	1.78	0.60	0.24	0.13	1.25
2005	88	1.05	1.64	0.63	0.23	0.12	1.14
2006	90	0.56	1.35	0.60	0.23	0.12	1.14
2007	92	0.87	1.53	0.61	0.24	0.12	1.16

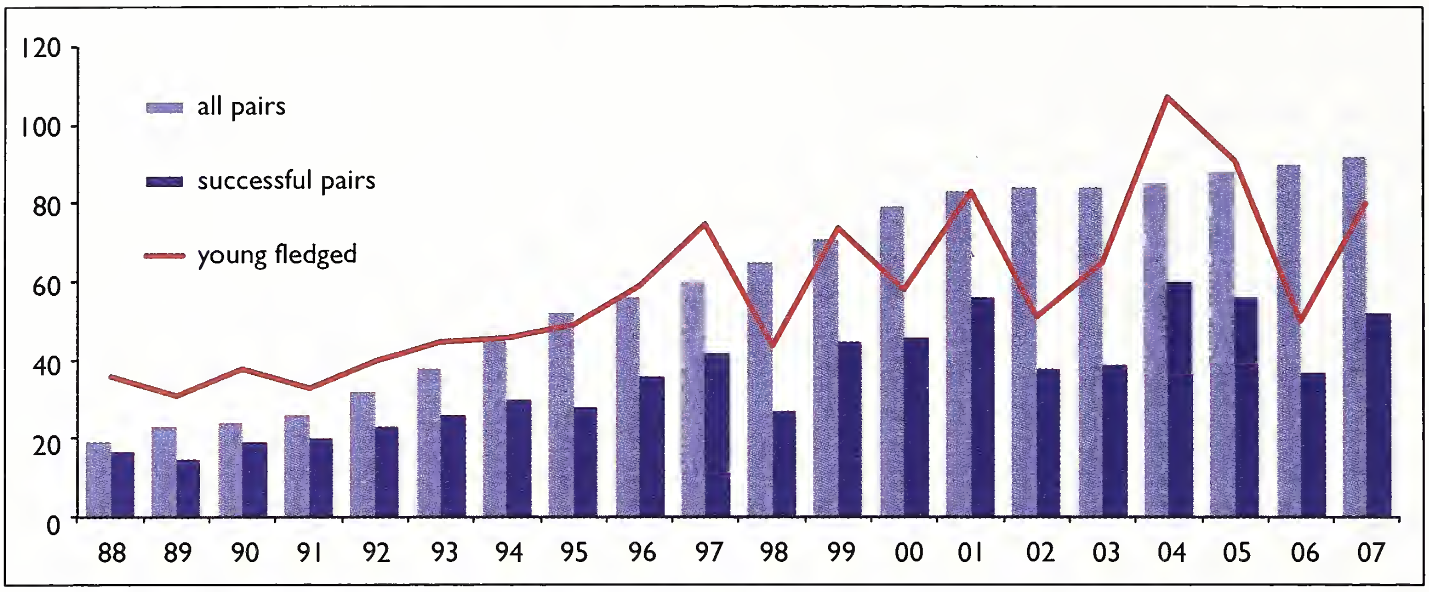


Fig. 2. Annual numbers and breeding success of Common Buzzards in the study area, Avon, 1988–2007 showing the total number of pairs (pale blue), successful pairs (dark blue) and chicks fledged (red line).

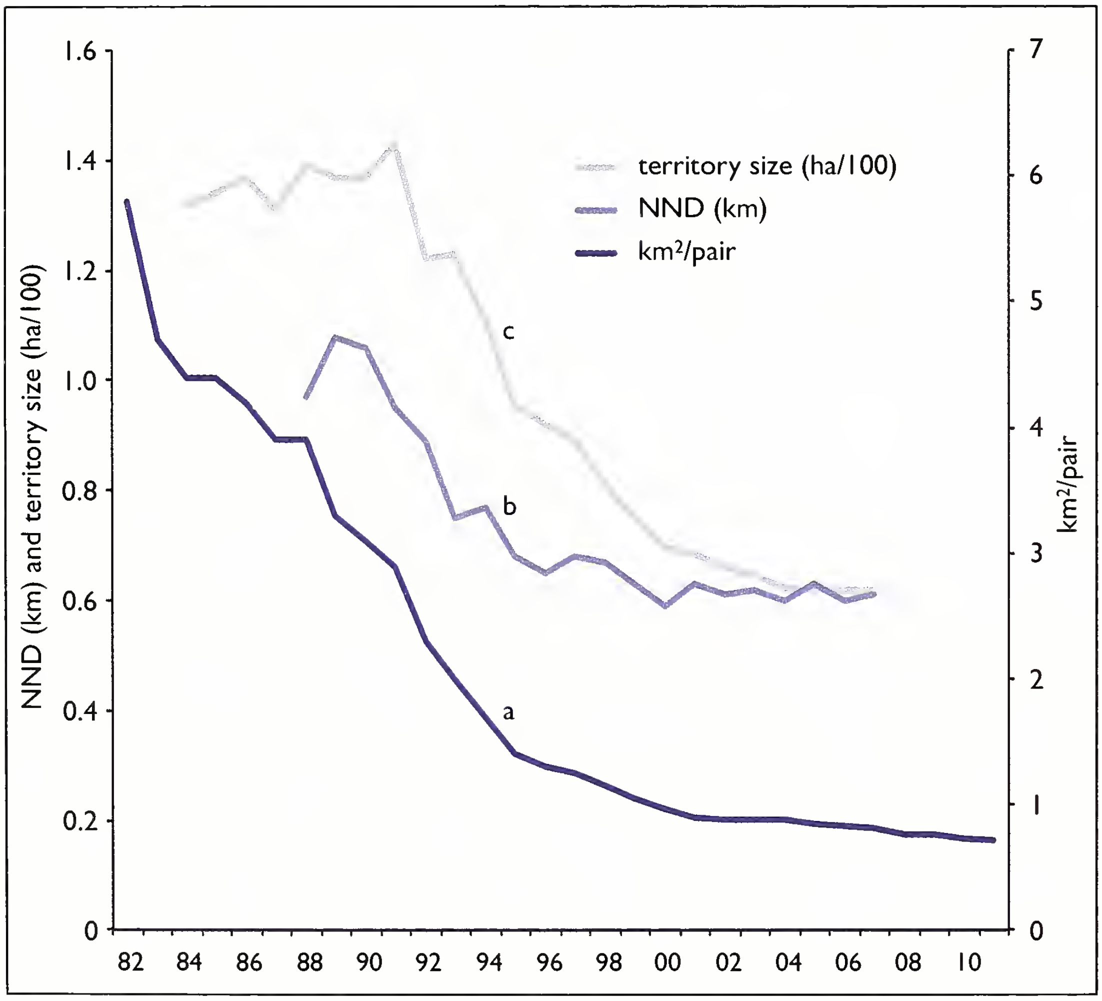


Fig. 3. Three measures of density of Common Buzzards in the study area: a) km²/pair 1982–2011; b) Nearest Neighbour Distance (NND), 1988–2007, in km; and c) territory sizes in ha, 1984–2007. The early 1990s mark a sudden fall in NND and territory size.

Table 1 gives the numbers and density of pairs in the study area for each year. The area/pair (in km^2) for each year is shown in table 1 and fig. 3a. There was a rapid decline, from 5.8 km^2/pair in 1982 to 0.9 km^2/pair in 2001, after which there was little change, indicating that the population was close to saturation.

The means of NNDs (which included all pairs, whether successful or not) fell from around 1 km between 1988 and 1991 to around 0.6 km between 1999 and 2007 (table 2, fig. 3b), again indicating that the population appears to be saturated. The actual NNDs varied from a maximum of 2.86 km to a minimum of just 0.12 km (table 2).

Mean territory size declined from 139 ha in 1988 to 61.9 ha in 2007 (and to 56.4 ha by 2010; table 1, fig. 3c). Individual territory size varied from 233 ha (in 1994) to 18 ha (in 2007; table 1).

Breeding success is shown in table 2 and fig. 2. Table 2 shows that the mean numbers of chicks produced per pair declined over the study period, fairly steadily for successful pairs but more erratically for all pairs, since fluctuations in the proportion of nests that produced young varied from a high of 89.5% in 1988 to a low of 41.1% in 2006 (fig. 4). As the population grew, brood size declined,

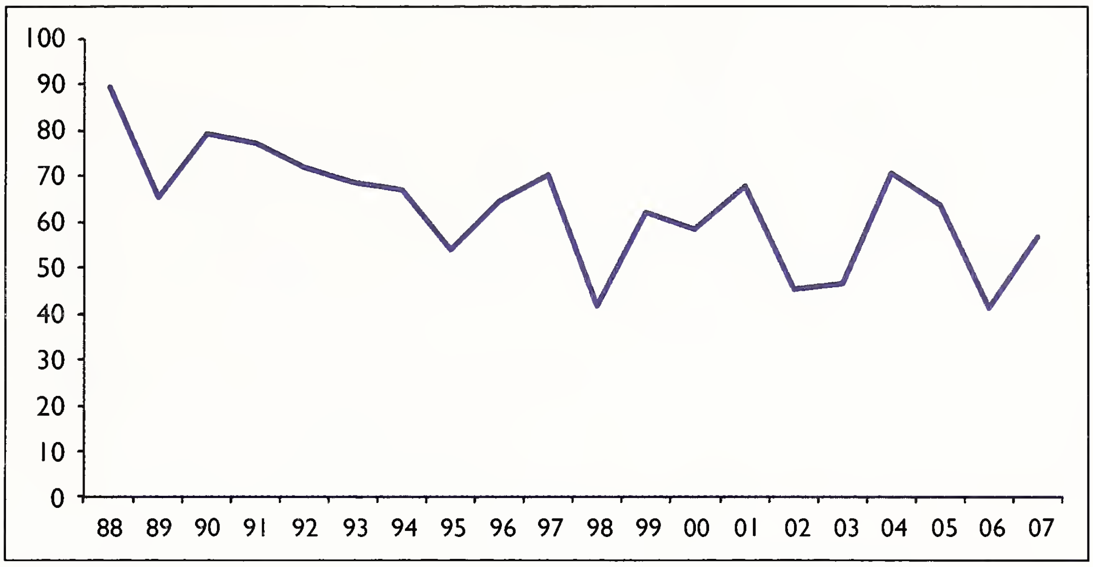


Fig. 4. The percentage of successful pairs of Common Buzzards in the study area, 1988–2007. Over the 20-year period, a mean of 59.5% pairs in the study area were successful, fluctuating between 89.5% at the start and 41.1% in the penultimate year, as density increased.

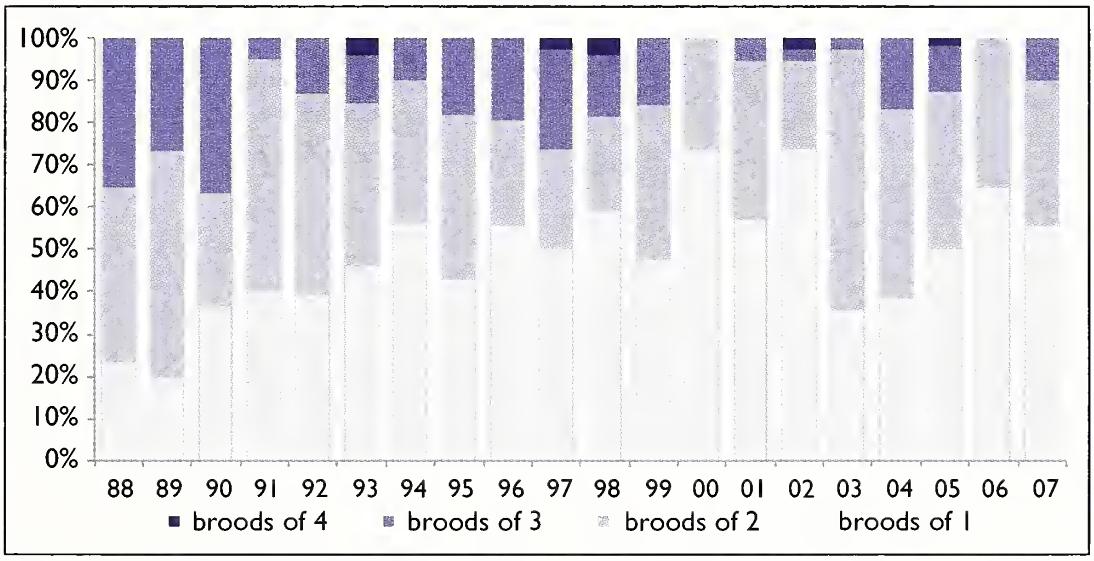


Fig. 5. The frequency of different brood size of Common Buzzards in the study area, 1988–2007. Broods of one increased disproportionately over the period as breeding density increased. There were five cases of broods of four (all from just two pairs) and in only two years were no broods of three fledged.

which is most clearly evident by the increase in broods of one (fig. 5). The means of the number of chicks per pair related to the three measures of density are shown in figs. 6–8. It seems clear from the trends that a density-dependent factor was having an effect.

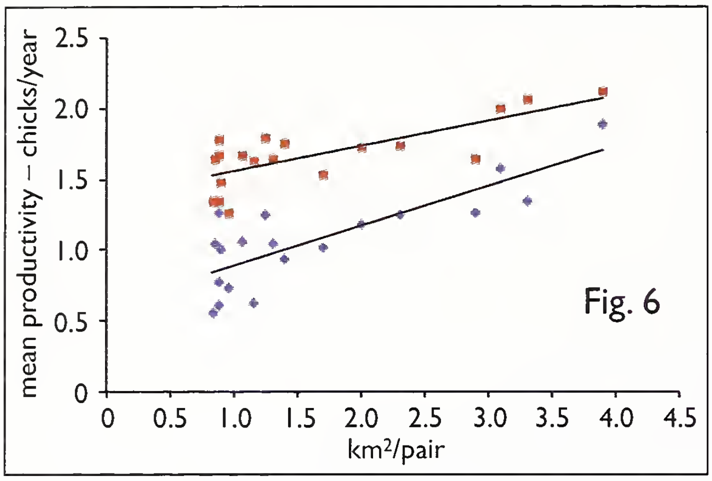
Breeding success of young adults

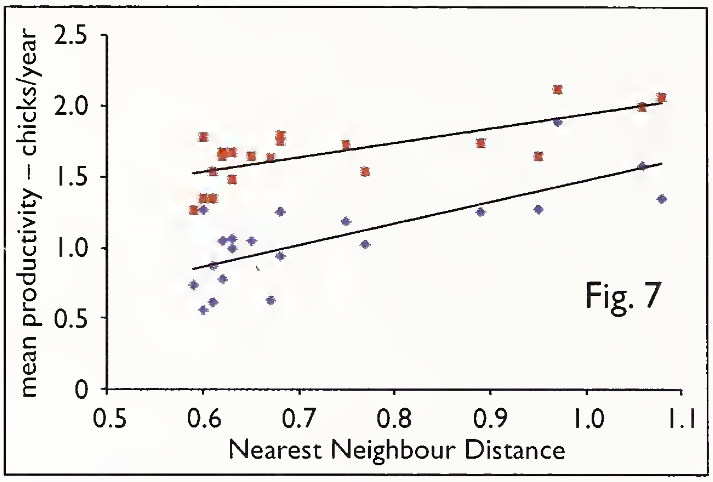
Assuming that once birds are settled in a territory they remained there, it was possible to follow 22 new pairs through their first five breeding seasons to check whether there was any increase in productivity over that period. When I compared the first year with an average of the next four years, the result was very significantly better ($t = 5.676, P < 0.01$). This suggests that pairs did improve in breeding success as they aged.

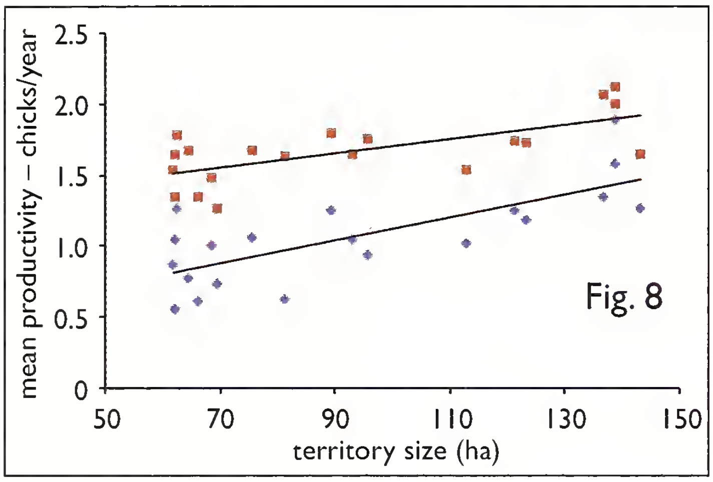
The effect of weather on breeding success

In an attempt to explain the large annual variation in breeding success (figs. 2 & 4), I compared productivity with various aspects of the weather – temperature and rainfall in April, May and June. High rainfall in May was significantly related to productivity (fig. 9) but other factors were also important (see below). Most chicks in my study area are very small in late May and thus potentially vulnerable to chilling in wet weather. This can be exacerbated by starvation if the parents fail to find sufficient food in poor hunting conditions. A Principal Component Analysis confirmed the combined effect of high density and rainfall in May on productivity but also showed a (negative) effect of high temperatures in April and (less so) in June[1]. Why high temperatures in April have an effect is unknown. In summary, it appears that weather conditions may have been an important factor affecting breeding success of Buzzards in my study area.

Footnote: [1] PC1 covered 37.5% of the variation, with an eigenvalue of 3.004. Other factors were not significant and had an eigenvalue of less than 0.3. PC1 variables produced values, in order, of -0.508 for rain in May, -0.483 for density, -0.440 for temperature in April, -0.401 for chicks/pair and -0.293 for temperature in June.







Figs. 6–8. The mean number of chicks per pair related to the three measures of density, 1988–2007: fig. 6 to km²/pair, fig. 7 to Nearest Neighbour Distance and fig. 8 to territories. The results for both successful pairs (red) and all pairs (blue) are shown. All trends were highly significant (fig. 6 all pairs rs = 0.829 $P < 0.01$, successful pairs rs = 0.625 $P < 0.01$; fig. 7 all pairs rs = 0.729 $P < 0.01$, successful pairs rs = 0.667 $P < 0.01$; fig. 8 all pairs rs = 0.689 $P < 0.01$, successful pairs rs = 0.574 $P < 0.01$).

Other effects of territories

Territory size varied greatly during the study period (table 1, fig. 3c), but did larger territories fledge more chicks? Between 1988 and 2007 there was no clear picture and over the years, broods of 0, 1, 2, or 3 were hatched from the largest territories. A Kruskal-Wallis test confirmed that there was no significant correlation between brood size and territory size ($K = 3.49$, $P > 0.05$).

I checked to see whether habitats within territories had any effect on breeding success, comparing woodland with pasture and arable with pasture. Woodlands varied in amount between territories, but this had no significant effect on breeding success. It proved to be difficult to test the effect of arable land since the amount of arable land varied between years. But I did find 18 territories where comparisons could be made over a seven-year period: nine with at least 50% arable land and nine with less than 20% arable (fig. 10). The territories with less than 20% arable produced more chicks, and the

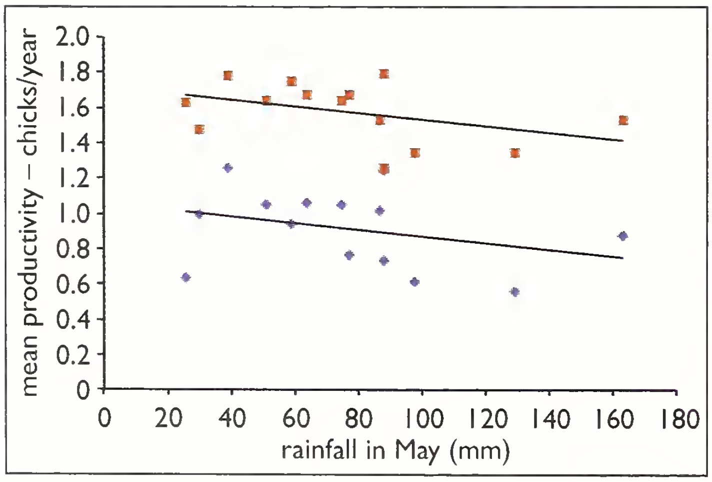


Fig. 9. Breeding success – mean number of chicks per pair, both for all pairs (blue) and for successful pairs only (red) – plotted against May rainfall, 1988–2007 in the study area. High rainfall in May reduces chick production. This correlation is highly significant (rs = 0.606, $P < 0.01$ for all pairs, rs = 0.546, $P < 0.02$ for successful pairs).

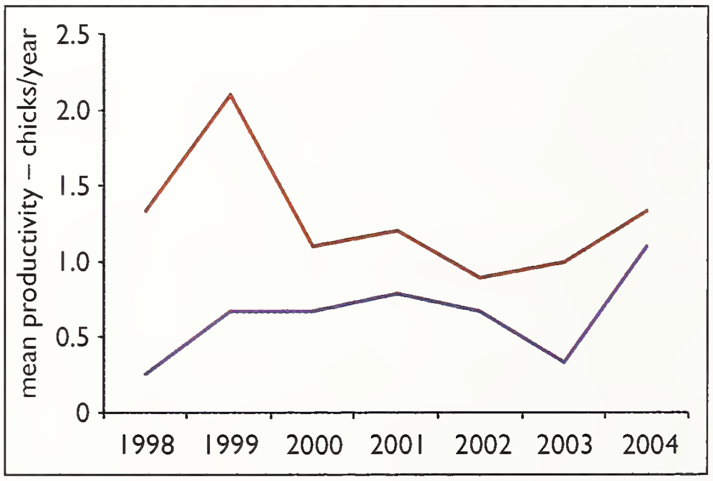


Fig. 10. A comparison of breeding success in 18 territories, 1998–2004, where nine territories contained >50% arable land (blue line) and nine <20% arable land (red line). Significantly more chicks fledged per pair from the latter and the difference in productivity was apparent every year: $t = 4.38$, $P < 0.01$.

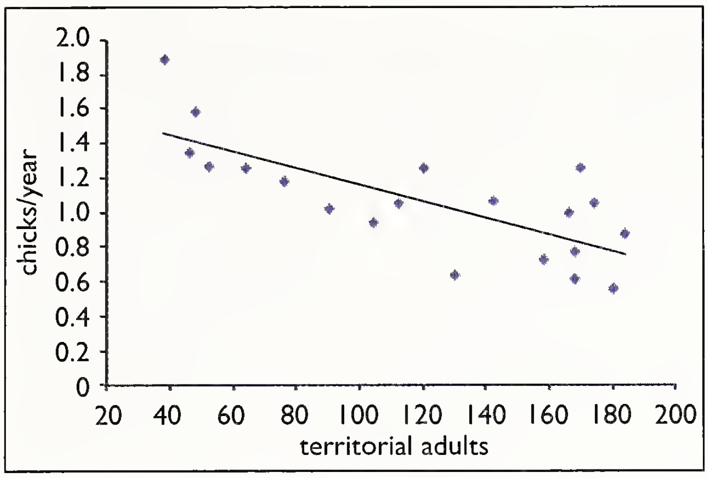


Fig. 11. Breeding success (mean number of chicks/pair, for all pairs) related to the number of territorial adults, 1988–2007. As density increased, breeding success declined significantly: rs = 0.706, $P < 0.01$.

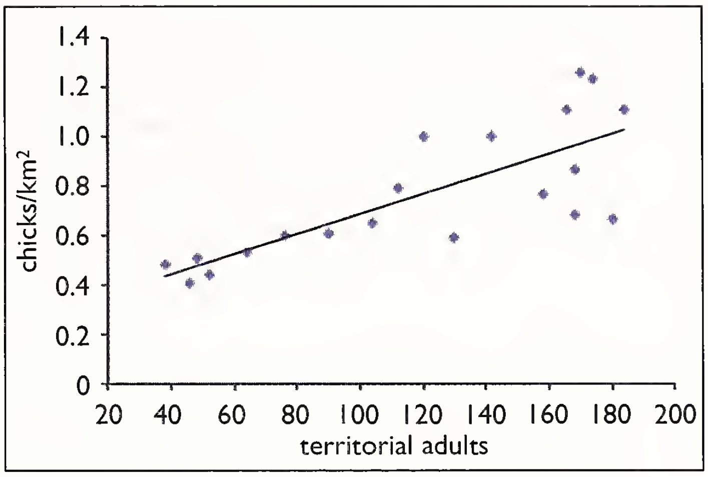


Fig. 12. The number of chicks fledged per km^2 in the study area, plotted against the number of territorial adults, 1988–2007: rs = 0.827, $P < 0.01$.

difference was highly significant.

Finally, I compared the number of territorial adults in the study area with breeding output (chicks per pair; fig. 11). As expected, there was a highly significant trend, with fewer chicks per pair as the number of territorial adults increased. Conversely, the number of chicks fledged per unit area increased (fig. 12). These results show that a high breeding density is not as good for individual pairs but better for the population as a whole.

Trios, quartets and polygyny

In 1993 I thought that I had discovered my first case of polygyny, but I was wrong. The second female in the territory was, in fact, the daughter of the pair from the previous year (in her second plumage). This second female was tolerated by both members of the pair; if she had been unrelated, she would have been chased out of the territory. This second female stayed slightly apart from the pair, but during the two following breeding seasons helped to provision the fledglings. In the first

Robert Canis/FLPA

164. Adult Common Buzzard on Rabbit *Oryctolagus cuniculus* prey, Kent, January 2009. Buzzards tend to take small Rabbits since full-grown individuals are too large for them, unless scavenged. This species is a frequent prey item at the chick stage, but not exclusively so.

year it seemed to keep well away from the nest area but in the second it did visit the nest. Three young were fledged in the second year (the only time three were fledged by the 'pair') and I speculated that one or more of the chicks was from the daughter's egg(s); earlier in the season I had seen the male mate with her. I have seen four other trios since and in each case the third, young, bird was a female. One of these developed into a quartet when the male in a trio died and the male from the adjacent territory took the two females over and still retained his original mate. Thus it was a case of polygyny with the male mating with all three females. The female and daughter shared a nest of five eggs (a rare occasion when I knew the clutch size).

A recent case of simple polygyny occurred in 2011 when the male in one territory died and was replaced by the male from an adjacent territory. That male ranged over both territories but the females kept to their own, and both fledged chicks.

Food

Buzzards in Avon were typical in that they preyed on a wide variety of mammals and birds to feed their chicks (based on my observations plus prey recorded at nests, and compared with data in *BWP*). Large birds, pigeons and corvids in particular, were always plentiful in the area. It was difficult to be sure of the status of small mammals in the study area. Their populations could have been affected by variations in the fruiting of trees and shrubs: a good crop could mean high overwinter survival and vice versa, thus affecting their availability to Buzzards the following spring (see Tubbs & Tubbs 1985). From 2001, data were collected on fruiting scores in the UK for 'Nature's Calendar', a survey carried out by the Woodland Trust, and data were available for my study area and surrounds for 2001–07. For some years, the samples were rather small and the scores for all years were rather similar, varying from 3.46 to 3.96 (where 1 is very poor and 5 prolific). Small-mammal populations are likely to have been equally stable, at a time when the Buzzards' breeding results varied widely, with fledging success from 41% to 71%. Rabbits *Oryctolagus cuniculus* were taken as prey during the chick stage if they were available, but never exclusively. The distribution and numbers of Rabbits in the study area varied considerably from year to year but there are no data to quantify this.

Analysis and discussion

I know of no published evidence for a similarly high density of Buzzards to that in my study area, although comparable increases must now be happening in many other areas of Britain (Sim *et al.* 2000; Balmer & Gillings 2009). The rapid spread eastwards in Britain (and a similar spread across Ireland), which is still progressing, must be fuelled by the increasing density and successful breeding in the now well-established populations in the lower-lying, biologically richer areas in the west. After being marooned in the more impoverished uplands for decades (see for example Moore 1957), Buzzards are now showing us just how densely and successfully they can breed in more ideal landscapes. My study population appears to be at, or very close to, saturation point. In only three years did it remain stable, in the other 27 years rising between one and eight pairs/year.

The measures of density in fig. 3 show, in each case, a flattening of the downwards trend. This underlines the progress towards saturation of the population, especially of NND (fig. 3b). From 1999 to 2007 the mean NND varied very slightly at just over 600 m and must surely represent a minimum spacing for Buzzard nests in this area.

Is the increase in density self-supporting?

Could the increase in numbers in my study area have been sustained entirely by the reproduction of local birds (i.e. without immigration)? To answer this question, for each year of the study (x) I calculated the likely number of survivors from young produced three years earlier (in year x-3) – and compared the expected number with the number actually observed. The mortality rates used were based on those in Kenward *et al.* (2000): for the first year 35%, second year 10%, 3rd year 20% and thereafter 10% (throughout the breeding life of adults). The higher third-year figure could be due to the extra stress that this age class might suffer

Robin Prytherch

165. Brood of one Common Buzzard chick in the study area on 19th June 1998. Note the fresh sprigs of greenery – a frequent addition to most nests when in use. Broods of one increased proportionately as the density rose over the duration of the study (see text).

Robin Prytherch

166. Brood of two Common Buzzard chicks in the study area on 19th June 1997 in the smallest territory that year, of 22 ha. The oldest is 27 days old and the other 23 days old. The female must have started to incubate once the first egg was laid. The nest is small but quite well concealed by the surrounding Ivy *Hedera helix*.

Robin Prytherch

167. Brood of three Common Buzzard *Buteo buteo* chicks in the study area on 20th June 1998. Two of the chicks are 27 days old, the other 24 days old, which indicates that the female started incubating once the second egg was laid.

Robin Prytherch

168. Brood of one Common Buzzard *Buteo buteo* chick in the study area, 8th July 2000. The chick was 36 days old and very boisterous, although harmless. The nest is concealed by a large growth of Ivy *Hedera helix*, making it difficult to see from the ground.

during pairing and establishing territories. I checked the possible accuracy of this procedure by starting with a target population of 38 adults (as in 1988) and deducting 10% per annum. Only two should have remained in 2007. This approximation of 20 years of breeding life in a Buzzard matches my observations of known birds that have lived as adults for up to 22 years.

My calculations predicted an excess of 41 adults, compared with the number observed, in the early years – up to 1993, when the population was growing slowly. Then, from 1994 to 2001, when maximum growth was occurring, there was a deficit of 64 adults, compared with the number observed. Finally, during 2002–07, as population growth slowed, there was an excess of 147 adults, compared with the number observed. I analysed the results for these three periods using a chi-squared test. For the first two periods there was no significant difference between the observed and expected results, but in the final period the difference was highly significant – there were fewer adults in my study area than was predicted, assuming the same rates of survival and no emigration ($\chi^2 = 24.12$, $P < 0.01$).

These results suggest that the period of maximum growth, 1994–2001, was possible only with the arrival of new adults from outside the study area. This is a logical consequence of adjacent areas to the west becoming saturated and overflowing into my study area. During the final period (to 2007), growth slowed again as the population neared saturation, meaning that a surplus of adults had to disperse away from the area, mainly to where space was available, farther east. The analysis shows that there was an excess of adult birds produced overall (in the 20 years) so the population *could* have been self-supporting. In reality there would have been immigration during the period of peak growth, followed by emigration. This is probably typical of what has happened in many areas along the main 'front' of the rapidly increasing population of Buzzards in Britain and Ireland.

But why did new pairs join an already densely packed area? It is likely that many were related to existing pairs, having dispersed only a short distance as juveniles. On maturing they might have tried to settle locally, but were forced to move away. Some other juveniles disperse widely and either settle without returning or move back to their natal area (Davis & Davis 1992; Walls & Kenward 1995; Prytherch & Roberts 2012). Therefore, many new adult birds in my study area (or in other similar areas) now have little choice but to move elsewhere in order to establish territories. Most 'empty' ground was likely to be to the east.

The topography of the landscape may also influence the density at which Buzzards settle. This principle applied in my study even as territory size was squeezed by the increasing density. I checked the territory maps shown in Tubbs (1974) for the New Forest and found that most of the territories fitted the contour patterns on the relevant Ordnance Survey maps. But why did some of the pairs in my study area defend large territories when it became obvious (in later years) that they could breed equally well in much smaller ones? Did they defend areas that, where possible, met the boundaries of adjacent pairs? I had the distinct feeling that this was the case as the pairs seemed to hunt for food in a much smaller area of their territory than that which they defended. This may have dissuaded wandering non-breeders from settling, even though it did not prevent it indefinitely.

It seems that high densities could become familiar over large areas of Britain in the relatively near future. So when did this amazing upsurge in the Buzzard population start? We know that the population was growing slowly during the first half of the twentieth century, due mainly to reduced persecution (Moore 1957). The growth slowed, or halted, during the 1950s and 1960s due to the ravages of myxomatosis in Rabbits (the Rabbit is a major prey species) and organochlorine

Table 3. Details, in chronological order, of studies of Common Buzzards in Britain from 1937 to the present that are referred to in the text. Note that the majority of density trends are stable or positive after 1970. See text for further explanation. Key: Habitats: U = uplands, HF = hill farms, L = lowlands. Trends: + up (* from previous study), – down, = stable/saturated.

study period	habitat/ locality	study area, km^2	density, km^2/pr	density, prs/ 100 km^2/pr	trend	productivity (chicks/pair)	trend	Source
1937–67	U/HF	4,400	880	0.07–0.20	N/A	2.2	N/A	Holdsworth (1971)
1962–71	L	290	8.1–9.1	11.0–12.4	+	1.23	N/A	Tubbs (1974)
1972–82	L	290	8.8–15.3	6.6–11.4	–	N/A	N/A	Tubbs & Tubbs (1985)
1956–58	U/HF	33	2.2–2.8	36–45	N/A	0.5	N/A	Dare (1998)
1961–69	U/HF	33	3–4	24–33	–*	0.6–0.9	+	Dare (1998)
1990–93	U/HF	33	1.9–2.1	48–52	+*	0.8–1.1	+	Dare (1998)
1971	U/HF	94	6.7	15	N/A	N/A	N/A	Halley (1993)
1988–89	U/HF	94	4.3	23.4	+*	N/A	N/A	Halley (1993)
1975–79	U	475	4.17	24	=	0.6	N/A	Newton *et al.* (1982)
1975–79	HF	475	2.44	41	=	0.7	N/A	Newton *et al.* (1982)
1977–84	U	926	9.65	10.4	–	N/A	N/A	Dare & Barry (1990)
2003–04	U	926	4.8	21	+*	N/A	N/A	Driver & Dare (2009)
1994–1996	HF/L	100	1.24	81	+	1.2	N/A	Sim *et al.* 2001
1995–2004	L	60	1.07–1.9	53–93	+	1.28–0.75	–	Holmes (2012)
1988–2007	L	75	0.82–3.9	25.3–122.7	+	1.89–0.87	–	this study

pesticide contamination (Colin Tubbs in Gibbons *et al.* 1993; Newton 2013). Slow growth then returned. The answer may be revealed within other more detailed studies from the UK, which are discussed below.

Comparisons with other studies

In addition to my own, there have been three other long-term studies in Britain: 1937–67 in Yorkshire (Holdsworth 1971); 1962–82 in the New Forest, Hampshire (Tubbs 1974; Tubbs & Tubbs 1985); and 1995–2004 elsewhere in Avon (Holmes 2012). In these studies, numbers or densities were recorded for each year over at least ten years (table 3).

Three study areas were repeated at different periods: on Dartmoor, Devon, in 1956–58, 1961–69 and 1990–93 (Dare 1998); in central Highland in 1971 (Picozzi & Weir 1974) and 1988–89 (Halley 1993); and in Snowdonia, 1977–84 (Dare & Barry 1990) and 2003–04 (Driver & Dare 2009). Two other studies took place over shorter periods: in central Wales, 1975–79 (Newton *et al.* 1982) and on the English/Welsh border, 1994–96 (Sim *et al.* 2001). One other study, carried out in northeast Wales during 1978–2008 (Roberts & Jones 2009) was nominally over a 31-year period but the study area was divided into sub-areas and coverage was variable. I have also considered two other studies that measured increases by using soaring surveys (Shrubb 2000; Sim *et al.* 2000).

Most of these studies have been in upland areas and hill farms, or a mix of upland and lowland country, with only three exclusively in lowland areas, below 250 m (one in the New Forest and the two in Avon). Making comparisons is therefore rather tricky as density tends to be lower, territories larger and NNDs greater in upland than lowland areas, which in turn affects productivity. This is related to the variation in food availability in different habitats (Newton 1979). But even in lowland areas, variations in various environmental factors such as climate and soils, and in turn habitat, also affect density and productivity.

In Holdsworth's (1971) study, the number of pairs in Yorkshire increased between 1937 and 1967, but this was attributed to greater observer effort. In the New Forest, Tubbs (1974) recorded an increase in density over the first ten years (1962–71) from 11.0 to 12.4 pairs/100 km^2. Subsequently, density declined (probably due to food shortages) to 6.6 pairs/100 km^2 in 1981, recovering slightly to 7.2 pairs/100 km^2 in 1982 (Tubbs & Tubbs 1985). Dare's (1998) account of his three study periods on Dartmoor revealed a mixed picture of a decline (associated with food shortages) and then an increase in density when the population had recovered, in 1990–93. This revealed a net change from 36–45 to 48–52 pairs/100 km^2 over 35 years. The latter matches my figure of 50.7 pairs/100 km^2 in 1993 (table 1).

Halley's (1993) account of his 1988–89 study in Speyside compared his findings with the same study area in 1971 (Picozzi & Weir 1974). Population density had increased from 15 to 23.4 pairs/100 km^2. In central Wales,

John Hawkins/FLPA

169. Adult Common Buzzard with Wood Pigeon *Columba palumbus* prey, Shropshire, July 2005. Pigeons and corvids are frequent prey items.

Newton *et al.* (1982) studied populations in hill farms and upland sheep walks. Both areas showed no population trends during 1975–79 and the populations were thought to be at saturation point, with density in the hill-farm area at 41 pairs/100 km^2. Sim *et al.* (2001) looked at two 10-km squares in the West Midlands/Welsh border during 1994–96 and in one of them found a density of 81 pairs/100 km^2 (my figure was 74.7 pairs/100 km^2 in 1996). This population was increasing; see below (Sim *et al.* 2000).

In Snowdonia, Dare & Barry (1990) recorded a density of 10.4 pairs/100 km^2 during 1977–84. When Driver & Dare (2009) repeated the survey in 2003–04, the population had doubled, with density increasing to 21 pairs/100 km^2, by which time the density in my study was 113 pairs/100 km^2. Roberts & Jones (2009) recorded no specific densities in northeast Wales but strong anecdotal evidence pointed to a large increase in the population. The other study in Avon, a 60-km^2 study area southwest of Bath, ran in parallel with my study between 1995 and 2004 with density increasing from 53 to 93 pairs/100 km^2 over the period (Holmes 2012; see also below).

In two other studies based on soaring surveys, Sim *et al.* (2000) surveyed 196 tetrads on the English/Welsh border and recorded a 231% increase between 1983 and 1996. Shrubb's (2000) survey in north Breconshire recorded a 115% increase between 1983 and 1999. Interestingly, the Breconshire increase was much less over a longer period than that of the overlapping English/Welsh borders study. The former is farther west and therefore more likely to be closer to saturation than the latter.

In general these other studies showed a trend in productivity in the opposite direction to that in density (table 3). In Devon, productivity increased after earlier declines in density (Dare 1998); in central Wales stable density produced stable productivity (Newton *et al.* 1982); and in Avon, productivity declined as density increased (Holmes 2012; this study).

Table 3 does reveal more general trends. Prior to 1980 the situation is mixed, with densities stable, slightly increasing or decreasing (the last thought mostly to be due to prey failures). In central Wales, the population was stable and thought to be at saturation point. In the late 1970s in Avon I saw new pairs appearing in previously Buzzard-free areas. The Scottish population must also have been increasing then. This was probably also a period of consolidation as unrecorded areas filled with new pairs: those that could not find space in their natal areas must have moved on.

From 1980, all populations studied were increasing, and thus the reasons behind the subsequent surge in populations must originate in the late 1970s. Birds that avoided persecution were living up to 25 years, giving the possibility of no fewer than 20–22 breeding seasons (this study). The catalyst for this could have been the reinforcement in the law some 15 years earlier (the Protection of Birds Act, 1954–67, incorporated into the Wildlife and Countryside Act 1981) coupled with improved game-rearing husbandry and a (generally) more positive attitude by many gamekeepers and the general public to birds of prey and Buzzards in particular. Sadly, raptors are not universally welcomed, and there are notable exceptions, such as the recent outrageous proposal to trap and relocate Buzzards from shooting estates in Northumberland. Those plans were, fortunately, shelved, but the threat remains since it seems likely that alternative proposals may be put forward (for example, see *Brit. Birds* 105: 424–425).

The present study shows what must have been happening to Buzzards in many parts of Britain during the past 30 years. The figures in Holmes's (2012) study reveal that the density of his population was rapidly approaching that in my study area. The centre of his patch is about 20 km ESE of the centre of my study area, and the two are similar in terrain. The equivalent densities of the two populations were only 5–6 years apart, which represents a spread rate of about 40–45 km every ten years. In poorer habitat the spread rate is likely to be faster, assuming that productivity is constant, which is probably unlikely.

In 1800, Buzzards were probably common over large areas of Britain. Over the next 100 years or so they declined rapidly, due to widespread persecution, which left just remnant populations in western parts of the nation. During the last 95 years recovery was slow, due to a relaxation of persecution, but hampered by food shortages and the effects of pesticides, until about 30 years ago when recovery became rapid. More rigorous protection and changes in attitude among most sectors of human society has given the Buzzard the chance to reclaim almost all of its former range. We must ensure that there is not a relapse into our former misguided ways.

Acknowledgments

It is a pleasure to thank the many estate owners, farmers and other landowners who gave me permission to enter their fields and woodlands, including the Forestry Commission, the Tyntesfield Estate (formerly Lord Wraxall, now the National Trust), the Elton Estate (Clevedon), the Miles Estate (Walton-in-Gordano), the Barrow Estate (Antony Gibbs) and the Avon Wildlife Trust – I am thankful to them all for their encouragement and interest. I must also thank the Woodland Trust for allowing me to use data from their Nature's Calendar/UK Phenology Network Survey. Richard Bland provided data from his weather station in Clifton, Bristol. Dr Alan Feest guided me through statistical queries. Lyndon Roberts and Andrew Waygood helped in various ways. Finally, both Alan Feest and Ian Newton provided much encouragement and help and also read an earlier manuscript of the paper, passing on helpful comments that greatly improved the text.

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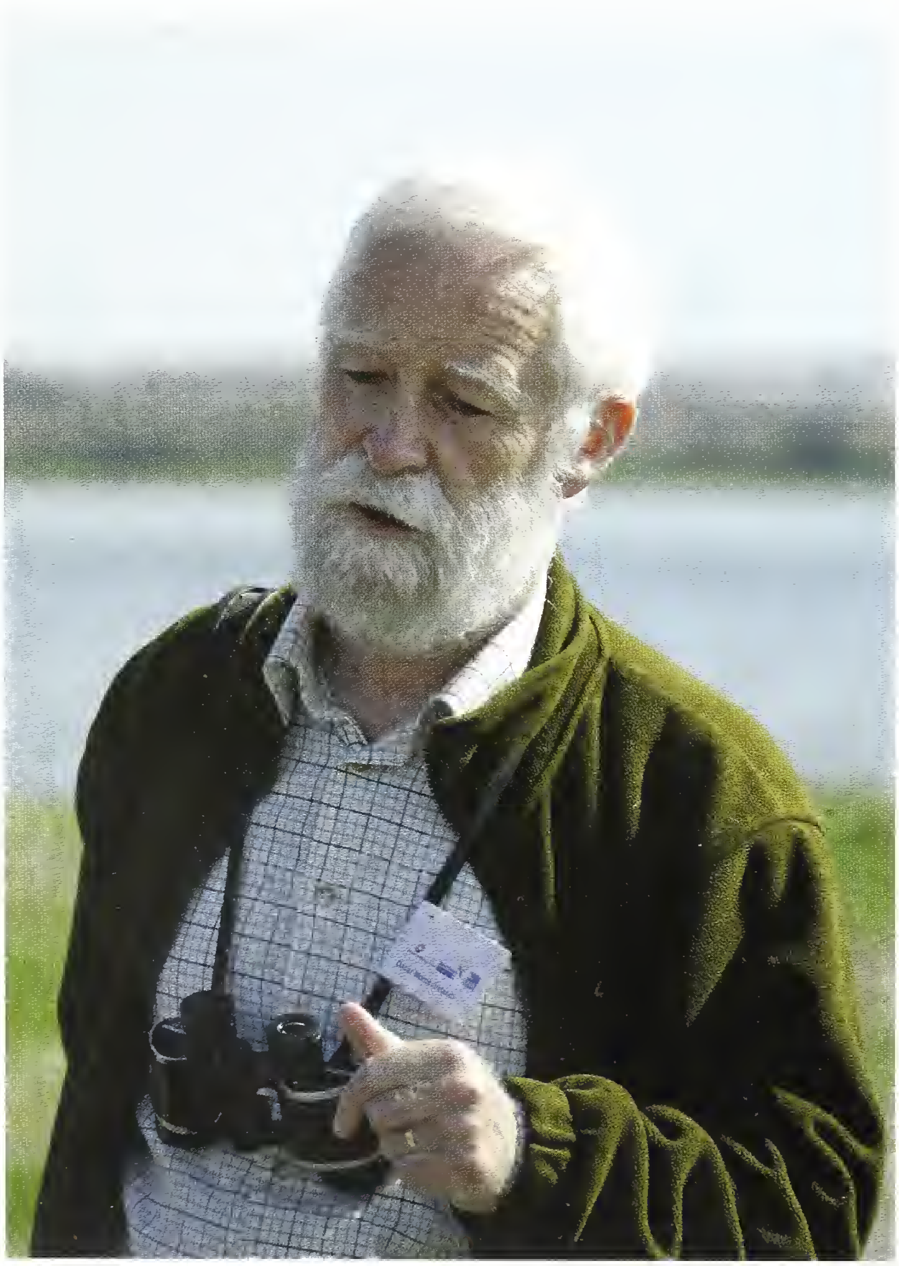
As well as long-term Buzzard studies, **Robin Prytherch** has been monitoring two Grey Heron colonies for the BTO census for almost as many years. He also takes part in other BTO surveys, including the BBS, and rings birds at the Chew Valley Ringing Station where he helps with a CES site and to train new ringers. He is an active member of the Bristol Ornithological Club and helps to edit its journal *Bristol Ornithology*. He has provided many illustrations, often of a technical nature, for several books and papers.

Obituary

Oscar J. Merne (1943–2013)

Oscar James Merne was born in south Co. Dublin in November 1943. The son of a bank manager, he followed his father into the bank... but only briefly. Indeed, all those present at a very moving humanist funeral service after his untimely death in January 2013 agreed that he was arguably the greatest Irish ornithologist to date. Yes, the list of candidates includes Major Ruttledge, Clive Hutchinson and Tony Whilde, all of whom contributed enormously and authored seminal works, but the breadth of Oscar's contribution and his activity in the field is inestimable: waterbird censuses and research (especially geese and swans), bird ringing, atlasing, long-term seabird monitoring, tern conservation, and much more.

His early work experience as a voluntary warden at Minsmere may have helped in landing him the job, in 1965, as the first paid warden of the Wexford Wildfowl Reserve (the 'Slobs'), famous for its large winter flock of Greenland White-fronted Geese *Anser albifrons flavirostris*, which marked the beginning of his career as an expert in wildfowl ecology and conservation. He was a key figure who, in the late 1960s, persuaded some of his peers and elders to found a single bird conservation organisation for Ireland, which operated as the Irish Wildbird Conservancy until 1996 when it became BirdWatch Ireland. Oscar continued to work for the National Parks & Wildlife Service (NPWS), although it too changed its name many times, up to his 'retirement' in 2004. He was pivotal in ensuring that Ireland fulfilled its obligations to the EU Birds Directive through the identification and designation of Special Protection Areas and he was also a major contributor to the first ICBP directory of Important Bird Areas in Europe, in 1989.


Alyn Walsh

170. Oscar Merne, at Lady's Island (Co. Wexford) during an International Roseate Tern meeting in April 2003.

Oscar did not follow a conventional path to becoming a natural scientist, and his university education was achieved in his early 40s in the form of a Trinity College Dublin Master's thesis entitled 'The infauna of the Shannon and Fergus estuarine mudflats as a food resource for shorebirds', in 1985. Dry-sounding stuff maybe, but it included the first multi-year, comprehensive, aerial survey (20 flights) of the waterbirds of Ireland's largest estuarine system in the mid 1970s. Also in the mid 1970s, he co-authored a book with Richard Roche on the Saltee Islands in Co. Wexford (*Saltees: islands of birds and legends*, O'Brien Press, 1977). The

Northern Gannet *Morus bassanus* colony numbered 200–225 pairs at that time; the last full count he completed, in June 2004, was of 2,446 AOS (*Brit. Birds* 98: 280–294), and no-one has managed one since. One of Oscar's first full articles in *BB* was 'Irish seabird islands', in the 1980 'Irish special issue' (*Brit. Birds* 73: 80–85), in which he described ten of the best of those islands; and in the course of his career, he went on to make long-term studies of the seabirds on several of them, in addition to Saltee. Most of these studies were published in *Irish Birds* and, without emptying my shelves and counting, you can be certain that each of the 35 issues will have at least one or more papers containing the results of a national survey or a time-series of observations/counts at a single site in which Oscar was instrumental. He had a good eye for recognising 'snippets' of unusual behaviour and a steady stream of Notes to *IB* and *BB* resulted.

Although perhaps he did not live long enough to produce 'the book of his life', there are hundreds of papers, reports, book chapters and species accounts that collectively demonstrate that he was a productive writer as well as a master field observer. The following species accounts give a taste of his wide-ranging expertise: Bewick's Swan *Cygnus columbianus*, Whooper Swan *C. cygnus* and White-fronted Goose in the *1981–84 Winter Atlas* (1986); Sandwich *Sterna sandvicensis* and Roseate Terns *S. dougallii* in the *EBCC European Atlas* (1997): Roseate Tern and Razorbill *Alca torda* in the *Migration Atlas* (2002); and Razorbill in the *Seabird Populations of Britain and Ireland* (2004).

There was not much in the way of a 'private time' for Oscar. Being a very generous and open person, his family home in Bray, Co. Wicklow, was often a first base for new (and returning) tern colony wardens bound for a season on Rockabill, trainee ringers and Gannet researchers heading to Saltee. Collectively, the Irish ornithological community is most appreciative of the support and tolerance of Margaret, Oscar's wife, in assisting these projects for all those years!

Oscar was diagnosed with cancer three years before his death, yet for a year or two we could detect hardly any change in his frenetic schedule of fieldwork and other commitments. By 2012, however, he had slowed down somewhat and, realising that time was running out, began writing at a greater rate. It is a measure of the man that he had written several years' worth of articles, to be published posthumously, for the environmental newspaper *Sherkin Comment*. Among his last serious works were a paper with Tony Fox and his former NPWS colleagues on the advancement of spring departure dates of 'Wexford–Greenland' White-fronts and a chapter in *Bird Habitats in Ireland* (co-authored with James Robinson and published in 2012) on 'Estuaries and Coastal Lagoons'. In other words, a species and a habitat very close to his heart and with which he had a lifelong association.

All of us privileged to have spent time with him on his favourite islands – Great Saltee, Great Skellig, Rockabill, Lambay and others – have fond memories of nights with a glass of French wine listening to stories of his travels and ornithological exploration of planet earth, which he had an incredible ability to recount in exact detail. What a life! Oscar, we miss you and we salute you.

Steve Newton

Letters

Plumage variability in Marsh Harriers

In their recent paper on plumage variability of the Marsh Harrier *Circus aeruginosus*, Blanc *et al.* (2013) stated that: 'a rare and localised dark morph has been described in the eastern part of the breeding range (Clark 1987)... but there are no published records of this dark morph in western Europe'. In fact, Clark (1987) pointed to a dark-morph adult male caught in Sussex in 1867, now preserved at the BMNH, Tring. Moreover, Bavoux *et al.* (1988) mentioned that they saw seven such birds (three males, four females) in their study area in western France. Bavoux *et al.* gave no detailed description but their wording leaves no doubt that they considered their birds as similar to the dark morph described by Clark. Finally, Fouquet & Yésou (1991) noted two more males similar to those described by Clark (1987), which were breeding in western France in the late 1980s; one of these birds had three dark young. In addition, we described a third adult male, the plumage of which differed from Clark's description but obviously was a dark morph too. Our three records were obtained at a time when we were undertaking an intensive study of the breeding avifauna of coastal wetlands in western France. That we have not recorded any dark-morph Marsh Harriers over the last two decades may be due to the combination of much lower coverage than in the late 1980s and the truly rare occurrence of this morph.

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How many Siberian Chiffchaffs are reaching Britain?

Collinson *et al.* (2013) described a preliminary genetic analysis of three birds from Britain & Ireland that were trapped and identified as Siberian Chiffchaffs *Phylloscopus collybita tristis* (hereafter *tristis*). All three were carrying the mitochondrial *cytb* sequence of *tristis*. The authors also discussed the findings of de Knijff *et al.* (2012), who found the *tristis cytb* sequence among a larger sample of Chiffchaffs, displaying a wider variety of plumage types perceived as 'greyer' than nominate *P. c. collybita* (hereafter *collybita*). They may have missed some *P. c. abietinus* (hereafter *abietinus*), since many are very similar to *collybita* (Svensson 1992), but de Knijff *et al.* found that all individuals tentatively assigned to *abietinus* carried the *tristis cytb*.

Collinson *et al.* discussed two possible interpretations of these findings: that Chiffchaffs reaching western Europe which have previously been identified as paler and greyer examples of *abietinus* (or as indeterminate *abietinus*/*tristis*) are in fact *tristis*; or that there is ongoing maternal introgression of *tristis* DNA into *abietinus* populations. These two interpretations are not mutually exclusive but, if it was assumed that such 'greyer' Chiffchaffs are predominantly thoroughbred *tristis*, then how many 'Siberian Chiffchaffs' are reaching Britain? Pennington *et al.* (2004) noted that 60 Chiffchaffs on Fair Isle on 10th October 1991 were comprised 'wholly of greyish northern/eastern races' while most of the 100 on 18th October 1990 'were also *abietinus* or *tristis*'. Flood *et al.* (2007) noted that in a typical year on Scilly 'numbers of greyer birds scarcely seem to be greater than 10' but also that '*abietinus* made up at least 30% of 212 on 22nd October 1984'. The annual reports of the Flamborough Bird Observatory and Flamborough

Ornithological Group include double-figure day-counts for *abietinus* in at least nine years between 1991 and 2010, with a peak of 41 on 13th October 2002 (Brett Richards *in litt.*). These are the outstanding years and many will be less productive. However, if such claimed *abietinus* and 'greyer' Chiffchaffs were all attributable to *tristis*, it would imply that double-figure totals of 'Siberian Chiffchaffs' occur quite widely and that between 60 and 100 may occasionally reach a single area or archipelago on a single day. Localised day-totals approaching three figures would suggest that, throughout the autumn, total numbers nationwide could well reach four figures in the most productive years.

Does the evidence now indicate that individuals perceptibly paler and greyer than *collybita* are indeed safely attributable to *tristis*, even when they display features at variance with current identification criteria? If so, Collinson *et al.* suggested that records committees may be applying overly strict criteria for acceptance of *tristis*. I have several reservations. If such paler and greyer Chiffchaffs are invariably *tristis*, this suggests radically widened plumage limits for *tristis* but rather restricted limits for *abietinus*. This seems contrary to the images of *abietinus* from Finland (on http://birdphoto.fi/lajikuvat/phycol), which certainly include 'greyer' individuals. Dean & Svensson (2005) listed several possible sources of Chiffchaffs perceived as paler and greyer than nominate *collybita*: as well as variant *tristis* and *abietinus*, there are potential hybrids between the two taxa, as noted too by Collinson *et al.* It is often asserted that, since the potential hybrid zone is small in comparison with the vast range of *tristis*, the proportion of potential hybrids reaching western Europe will be insignificant. This assumes an equal likelihood of arrival from all parts of the range, yet it may well be that the majority of individuals originate from more restricted areas. For example, it has been proposed that the increasing numbers of Siberian Chiffchaffs wintering in western Europe arise from an initially small number of individuals successfully overwintering, returning to their natal areas, and passing on their genes and migration strategies to their offspring (see Gilroy and Lees (2003) for a more general discussion). Such a process is unlikely to operate across the entire range of *tristis*. If a majority of Siberian Chiffchaffs originate from relatively westerly parts of the range, which embrace the potential hybrid zone, then hybrids may comprise a more significant proportion than is being suggested.

As yet, genetic studies have been too narrowly focused in terms of season (late autumn/winter) and scope (mtDNA) to conclude unequivocally that all paler and greyer Chiffchaffs are *tristis*, and to exclude *abietinus* and/or hybrids. In addition, there is increasing evidence of greater call flexibility among Chiffchaff taxa than has sometimes been claimed (see especially http://birdingfrontiers.com/2013/01/02/siberian-chiffchaff-and-common-chiffchaff-part-2). Unresolved issues signal caution before the constraints of current identification criteria for *tristis* are discarded.

Acknowledgments

I would like to thank Martin Garner, Magnus Hellström, Kevin Lane, Mike Langman, Antero Lindholm, John Martin, Brett Richards, Roger Riddington, Lars Svensson and Grahame Walbridge for providing regional data and other information. Their input does not necessarily imply endorsement of my text.

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Statistics, birdwatching and the Hastings Rarities

I refer to Jeremy Greenwood's discussion of the Hastings Rarities (Greenwood 2012). His incomplete quotation from Morris (2010) on p. 734 crucially omitted the word 'perhaps' that immediately preceded it (as in '... perhaps the analysis showed no more than that the rarities were unusual and statistically improbable events'). Thus, a deliberately provocative speculation was turned into a statement of fact. This was then used to suggest, wrongly, that I do not understand statistical tests. I fully appreciate Nelder's analysis, but proposing fraud requires the acceptance of equally improbable scenarios that Jeremy ignores because relevant p-values could not be calculated. Moreover, there is actual evidence, not just probability values, that blaming the taxidermist George Bristow for a major ornithological fraud represents an unsubstantiated calumny, now unfairly perpetuated. In my view, the Hastings Rarities deserve a more balanced analysis.

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Rarities Committee news

Olive-backed Pipit is removed from the BBRC list

In January, we announced that we would review the status of three species currently on the BBRC list (Lesser Scaup *Aythya affinis*, Citrine Wagtail *Motacilla citreola* and Olive-backed Pipit *Anthus hodgsoni*) at the Committee's AGM, in March. We decided that, from 1st January 2013, Olive-backed Pipit will no longer be a BBRC species. Following a bumper year in 2012 (we expect some 40+ records to be published in the 2012 report, which will appear in the October issue of *BB*), there will have been more than 170 records in the past decade. This species thus meets the established threshold for removal from the BBRC list: more than 150 records in the last ten years, with ten or more in eight of those years.

There were about five records of Lesser Scaup and 15 of Citrine Wagtail in 2012, giving totals of c. 115 and 120 respectively in the past decade, and these species thus fall short of the threshold for removal. Many sightings of Lesser Scaup relate to birds that first appeared in previous years, which explains what may initially appear as a rather low total for that species.

BBRC is sponsored by Carl Zeiss Ltd and the RSPB

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Secretary Nigel Hudson, Carn Ithen, Trench Lane, Old Town, St Mary's, Scilly TR21 0PA;
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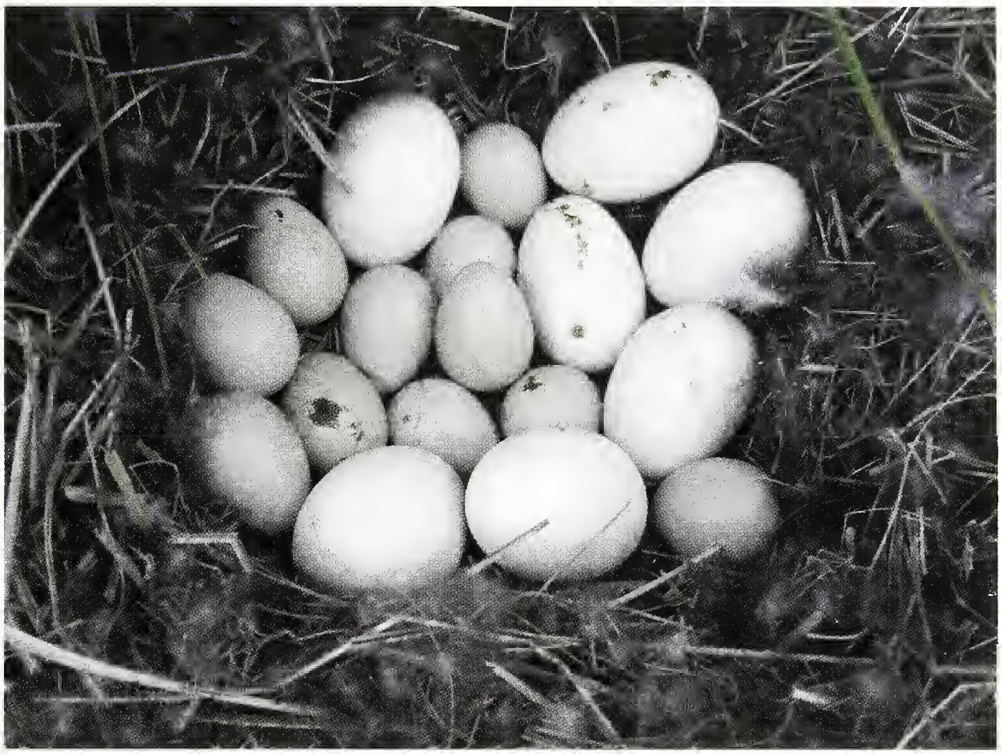
Notes

Egg-dumping by Grey Partridge

On 18th June 2012, we flushed a Gadwall *Anas strepera* from a nest in the sand dunes on Blakeney Point, Norfolk. After a careful search among the Marram grass *Ammophila arenaria* we found the nest, which contained seven Gadwall eggs but also 11 Grey Partridge *Perdix perdix* eggs (plate 171). *BWP* states that a particularly large clutch (24 eggs or more) in a Grey Partridge nest is often the result of two females but does not mention interspecific egg-dumping.



Edward Stubbings

171. Nest with seven Gadwall *Anas strepera* eggs and 11 Grey Partridge *Perdix perdix* eggs, Blakeney Point, Norfolk, June 2012.

The seven Gadwall chicks hatched on 19th June, and by 20th had left the nest, leaving the Grey Partridge eggs unincubated. Two of the partridge eggs started to hatch that evening but the chicks died before the process was complete. Sadly, there was no further progress and the eggs were cold by 21st June.

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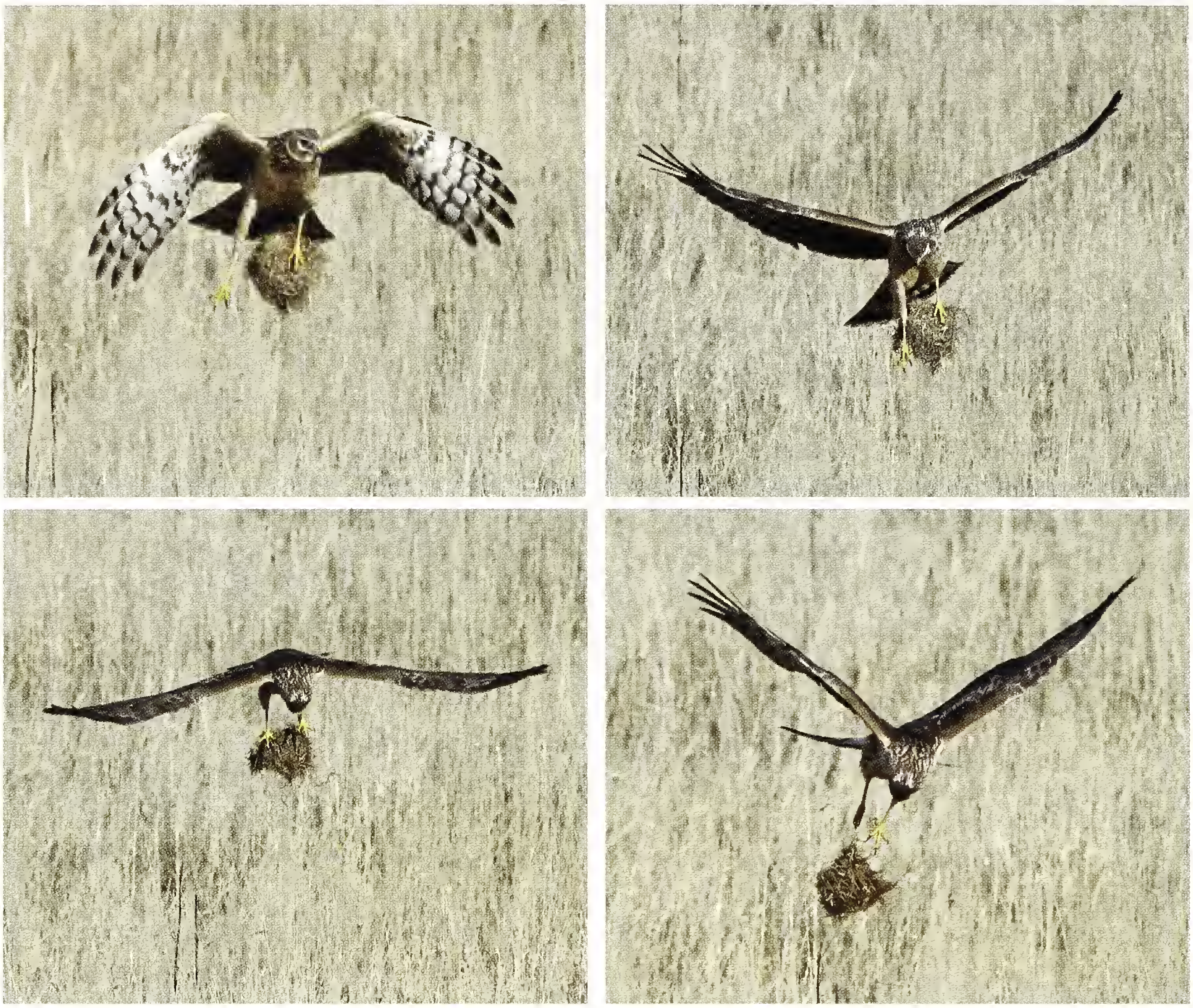
Norfolk NR25 7NW

Unusual Hen Harrier behaviour

On 10th March 2012, I watched a ringtail Hen Harrier *Circus cyaneus* near Wynyard, Billingham, Cleveland, hunting over an area of dry, rank grassland. The bird had been present for at least two weeks, perhaps longer. As it quartered the meadow, it used its talons to pick up what appeared to be balls of dried grass, hovered while staring down at the balls and then watched them as they were released and fell to the ground, before moving on again (plates 172–175). Twice it dived down to the ground at the end of this sequence. This behaviour was repeated five or six times before the bird eventually made a kill and flew off with a vole-sized prey item.

I suspect that the balls were small-mammal nests and the harrier was watching for mice or voles dropping from them. Certainly the routine described seemed to be part of the bird's usual behaviour rather than random acts or play.

A. C. Bent's *Life History of the Marsh Hawk* (1937) contains the following passage: 'Eugene S. Rolfe (1897) noted the following interesting attempt to secure a meal: "Many times I have watched the Marsh Hawk [Northern Harrier *C. cyaneus hudsonius*] sailing low and keenly scanning the ground on the open prairie, and suddenly pouncing down and quickly ascending again with an empty mouse nest in its talons, and on one occasion I followed behind for fully two miles and in that distance it picked up and dropped seven of these empty nests. On examination they proved to be simply wads of fine dried grasses, and it was easy to see that if these had all chanced to be occupied by families of young mice, the foray of that particular Hawk


Ian Forrest

Ian Forrest

Ian Forrest

Ian Forrest

172–175. Hunting Hen Harrier *Circus cyaneus*, Billingham, Cleveland, March 2012.

would have been most fruitful in the destruction of these small pests.'"

I can find no other reference to similar behaviour in Hen Harriers.

N. I. Forrest, Billingham

Reference

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Corvids exploiting Longworth mammal traps

The intelligence and problem-solving ability of the crow family (Corvidae) is well recognised (Emery & Clayton 2004) and *BWP* reports wild Magpies *Pica pica* and Carrion Crows *Corvus corone* learning to exploit food sources in containers unwittingly provided by humans, for example opening milk bottles and egg cartons. While monitoring small-mammal populations on the 800-ha Hillesden estate in Buckinghamshire, Anthony Turk and I encountered Carrion Crows, and possibly Magpies, exploiting a novel food source and in turn disrupting monitoring activities.

Small-mammal trapping was undertaken over three weeks in November 2005, 2006, 2008 and 2010, and repeated the following May. Thirty trapping transects were sited on the grassy margins of arable fields, each consisting of 11 Longworth live-capture traps (Gurnell & Flowerdew 2006) spaced 10 m apart. Traps were filled with hay bedding, baited with wheat and left locked open on 'pre-bait' for four days. On the fourth day, the traps were re-baited with wheat, chopped carrot and blowfly pupae (Calliphoridae), set to catch and then monitored each morning and afternoon for the next three days.

Trap interference was occasional from 2008 but increased from 2010. Interference consisted of traps being disturbed from their position and moved up to 1 m onto the relatively open edge of the cropped area, where many were disassembled, all bedding removed and the wheat and blowfly pupae taken (but not the carrot). In May 2011, systematic records were made of trap interference to try and identify the culprit(s).

Overall, ten transects (33%) suffered from disturbed traps, in total affecting 20% of monitoring visits and 6% of available traps. Of these, more than half (58%) were disturbed during the middle part of the day, between morning and afternoon monitoring. Trapping was abandoned on two transects owing to interference. Badgers *Meles meles* or Foxes *Vulpes vulpes* were initially suspected but the lack of field signs, together with disturbance in the middle of the day (sometimes alongside public footpaths), appeared to rule out these species. The evidence, including footprints and shed down feathers around the traps and scratch marks on the traps, was more suggestive of corvids. Carrion Crows and Magpies were not culled on the estate and were seen frequently in nearby hedgerows; Foxes and Badgers were also present but never seen in daylight.

Then, during afternoon monitoring on 18th May 2011, I observed a Carrion Crow disturbing a trap, with a Magpie some 2 m away. Both birds flew away as I approached. The trap had been disturbed from its position but not disassembled, while two adjacent traps were also disturbed. Taken together, the observation, timing of disturbance and consistent field signs suggest beyond reasonable doubt that corvids were responsible for most or all trap interference. The distribution of trap interference on transects over 2.5 km apart also suggested that several individuals were involved.

Attempts to limit interference (pinning traps to the ground, partially burying traps or covering with ground litter) met with little success. It was surmised that corvids were primarily interested in taking the wheat and blowfly pupae bait (since trap interference occurred on transects where few animals were caught), but the possibility that predation of captured small mammals was also a motive cannot be ruled out. Enquiries with the Mammal Society (pers. comm.) provided no anecdotal or published evidence of corvids interfering with Longworth traps but my experience suggests that if long-term, systematic trapping regimes enable birds to associate traps and/or their locations with food, corvid activity can disrupt monitoring efforts significantly.

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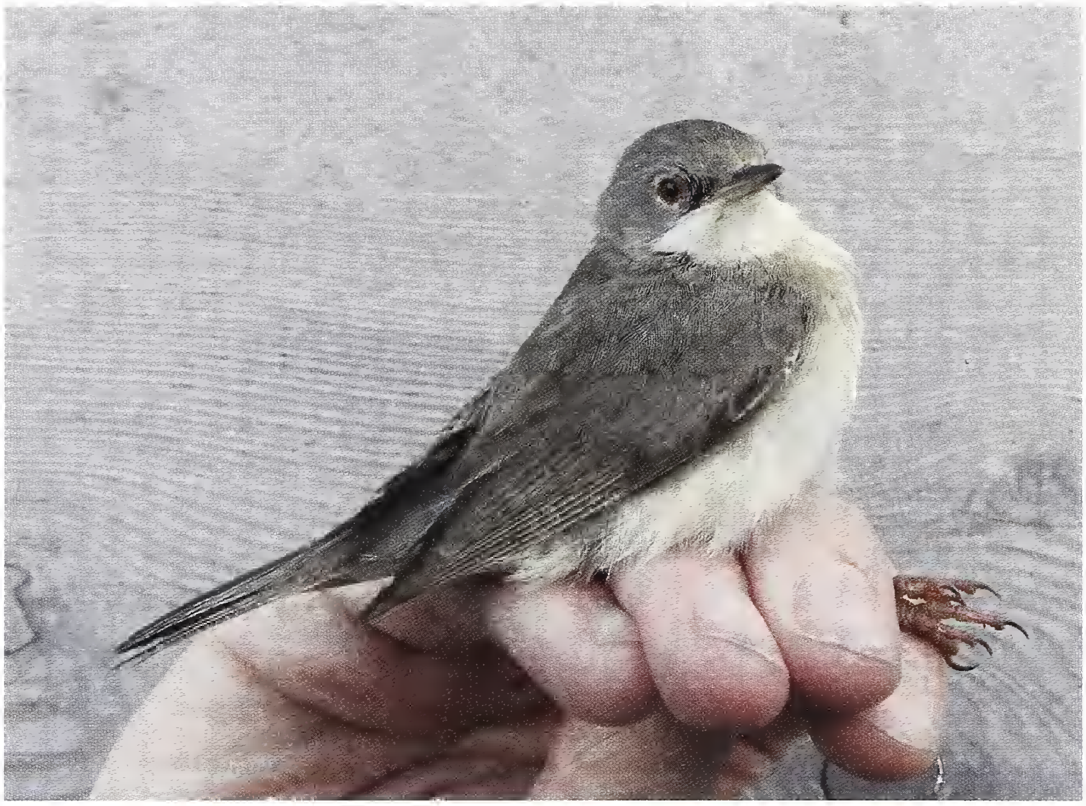
A female 'Eastern Subalpine Warbler' on Fair Isle

A female Subalpine Warbler *Sylvia cantillans* was found at Lower Leogh, Fair Isle, on 26th May 2012. The following day it appeared in the Bird Observatory garden and was trapped there that afternoon. Measurements suggested that it was of the eastern form *S. c. albistriata* (table 1). The wing length was 66 mm (mostly 60–64 mm in *albistriata* but 57–61 mm in other subspecies); the tail/wing ratio was 0.86 (usually below 0.90 in *albistriata* but above 0.90 in other subspecies) and the distance between P10 and P9 was 36.9 mm (usually above 32 mm in *albistriata* but rarely over 34 mm in other subspecies)(Shirihai *et al.* 2001). Contour feathers that dislodged in the mist-net and bird bag were retained for genetic analysis.

The mitochondrial cytochrome b (*cytb*) gene was amplified and sequenced at the University of Aberdeen, using the universal avian *cytb* primers L14993, L15549 and H16065. Comparison of the sequence of the Fair Isle bird (EMBL Nucleotide Sequence Database accession number HF562847) with that of all Subalpine Warbler subspecies was carried out online using NCBI nucleotide



Will Miles

176. Female 'Eastern Subalpine Warbler' *Sylvia cantillans albistriata*, Fair Isle, May 2012.

Table 1. Biometrics of a female 'Eastern Subalpine Warbler' *Sylvia cantillans albistriata* trapped on Fair Isle, 27th May 2012 (all measurements in mm unless stated).

Tail/wing ratio	0.86	Weight (g)	11.7
P10–wing-tip	37.3	Fat score (0–8)	1
P9–wing-tip	1.2	Pectoral muscle score (0–3)	1
P8–wing-tip	WP	Wing length	66.0
P7–wing-tip	0.4	Tail length	57.0
P6–wing-tip	1.3	Tarsus length	20.0
P5–wing-tip	4.5	Bill length to skull	14.1
P4–wing-tip	8.1	Bill depth	3.5
P3–wing-tip	8.9	Bill width	3.7
P2–wing-tip	10.5		
P1–wing-tip	13.5		
P9–P10	36.9		
P10–primary covert	P10=PC		
Tertials–wing-tip	14.8		

BLAST (http://blast.ncbi.nlm.nih.gov/Blast.cgi). This confirmed that the bird was *S. c. albistriata*. Its *cytb* sequence was novel, but 99.9% identical (994/995 identical base pairs) to an *albistriata* (accession number EU760673) from Lesvos (Brambilla *et al.* 2008). The Fair Isle bird was 1–6 base pairs different from the seven *albistriata* sequences in the database from Lesvos and Dalmatia (Brambilla *et al.* 2008) and clearly falls within the *albistriata* group. The Fair Isle bird was next most similar (~98% identity, 18–23 bp difference) to birds of the 'southern *cantillans*' group of Brambilla *et al.* (2008) – birds from mid/southern Italy and Sicily. It was more divergent (~96% identity, 36–39 bp different) from the western *cantillans* group sampled in Spain and southern France (Brambilla *et al.* 2008). All database examples of 'Moltoni's Warbler' *S. c. moltonii* from northern Italy, Corsica and Majorca were at least 41 bp different.

This is the first genetically confirmed *S. c. albistriata* from Britain, though it does suggest that biometric criteria for identification of vagrant female *albistriata* are probably reliable.

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Nest success of Water Rails in the Netherlands

The nest survival and hatching success of the Water Rail *Rallus aquaticus* were studied in peat-bog marshes within polders in the Netherlands in the years 1989, 1993–95 and 1998 (de Kroon 2004). During the breeding season, from March to July, nests were systematically searched for in marshes where Water Rails were calling. If necessary, playback was used to increase the likelihood that birds were found. Important vocal reactions for locating the nest were four call types: (i) a soft drum or purring, (ii) a groan or grunt, (ii) the alarm-call 'phith', and (iv) the family-call 'pheeh-eeht' (Glutz von Blotzheim *et al.* 1973; *BWP*).

A total of 37 nests were found. Of these, seven were predated (table 1), two during the egg-laying period and five during incubation. Incubation begins the day before the clutch is completed (Glutz von Blotzheim *et al.* 1973).

Of the 37 clutches monitored, there was a combined total of 254 egg-laying days ('exposure days' in Mayfield terminology), although two clutches were lost before laying was complete. A total of 30 clutches hatched successfully, amounting to a total of 625.5 incubation days. In addition, five nests were lost during incubation, which included a total of 42.5 incubation days between them. In total, the number of egg-laying days and incubation days (including the lost clutches) amounted to 922 nest-days. Nest success was calculated by combining the egg-laying and incubation periods.

Results

The mean clutch size of 30 successful nesting attempts in this study was eight (compared with the mean of seven found by Flegg & Glue 1973).

Stage-specific daily failure rates were calculated according to the methods outlined in Mayfield (1961, 1975). The daily survival probability of nests during the egg-laying period was 99% (calculated as 254/(254+2)). Given an egg-laying period of seven days, the survival probability was 95% (0.9922^7), with 95% confidence limits of 82%–98% (Walters 1988). The daily survival rate for the combined number of incubation plus hatching days was 99% (calculated as 668/(668+5)). Given 20 days of incubation and one hatching day per nest, the survival rate of an entire clutch was 86% (0.9926^{21}), confidence limits 69%–93%. The nest survival probability of both periods taken together was thus 81% (65%–90%).

Of 11 eggs that failed to hatch, eight were found to contain embryos that had died prematurely and three to be infertile (determined by dissection). From a total of 243 eggs that survived to the hatching day (excluding 39 eggs from seven nests that were lost), 232 chicks hatched (95.5%). In Flegg & Glue (1973), the hatching success of 22 nests was 87%.

Table 1. Hatching success of Water Rail *Rallus aquaticus* eggs over five breeding seasons from three areas of Dutch polder. The number of clutches studied, number of eggs laid, number of eggs that failed to hatch, and the number of one-day-old chicks counted before they left the nest are presented. Numbers in parentheses refer to clutches and eggs lost prior to hatching.

	Clutches	Total eggs	Eggs not hatched	One-day-old chicks
1989	5 (1)	38 (5)	0	33
1993	8 (1)	53 (2)	6	45
1994	8 (2)	69 (15)	2	52
1995	9 (2)	69 (14)	2	53
1998	7 (1)	53 (3)	1	49
Total	37 (7)	282 (39)	11	232

Acknowledgments

I am grateful to Dave Leech and Rob van der Valk for constructive advice and comments.

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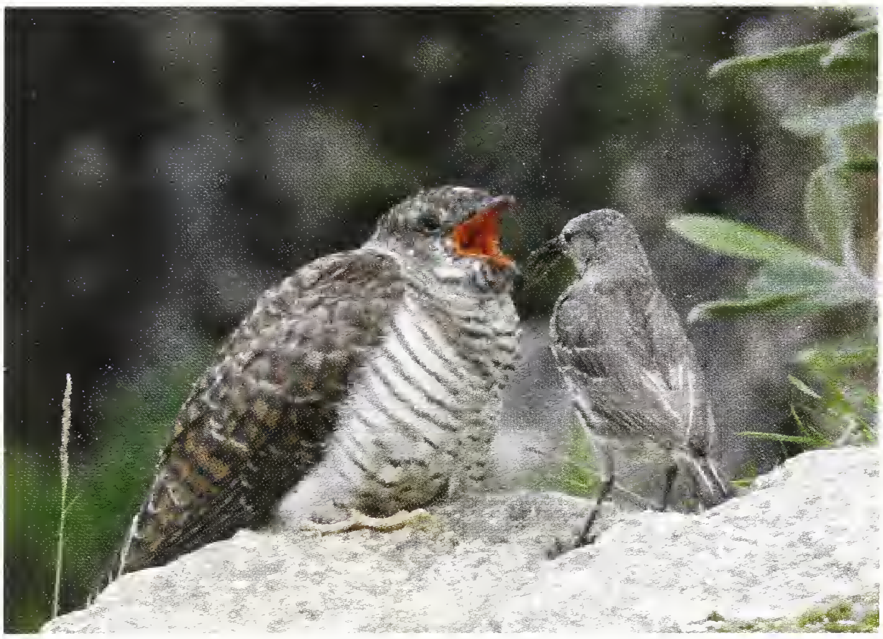
Diet of Common Cuckoos on the Isles of Scilly


Martin Goodey

177. Juvenile Common Cuckoo *Cuculus canorus* being fed by Rock Pipit *Anthus petrosus*, St Mary's, Scilly, July 2012.

The majority of young Common Cuckoos *Cuculus canorus* reared in the Isles of Scilly are fostered by Rock Pipits *Anthus petrosus*, which nest commonly along the coasts of the various islands. I have found fledged Cuckoo chicks being fed by Rock Pipits at Deep Point, on the east side of St Mary's, in three of the last four years. In previous years I have noted them being fed with various unidentified small flies, craneflies (Tipulidae) and land snails *Lauria cylindracea*. In late July 2012, I saw two adult Rock Pipits feeding a recently fledged Cuckoo with Sea Slaters *Ligia oceanica* (plate 177). Rock Pipits are known to catch *Ligia* (see *BWP*), so it is perhaps not surprising that a young Cuckoo would be fed the same by its hosts, but I cannot find crustaceans recorded in the known diet of Cuckoos. This pair of Rock Pipits returned with large slaters on numerous occasions over a period of an hour or so.

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Magpie nest on church spire

The Magpie *Pica pica* is a common bird in Paris, and there are many potential breeding sites in the trees and bushes of the Bois de Vincennes (a sprawling park on the eastern outskirts of the city). Both *BWP* and Birkhead (1991) mention that this species breeds occasionally in buildings, etc., but I have not found a specific reference to the adoption of an existing structure (though see *Brit. Birds* 84: 513). In late March 2012, I watched a pair of Magpies carrying sticks to the dome of a spire on the chapel of the Château de Vincennes and subsequent observations confirmed that the birds were in fact nesting there. As can be seen in plate 178, the birds saved themselves, through either laziness or cleverness, a considerable amount of effort by using the dome for constructing the nest.

Reference

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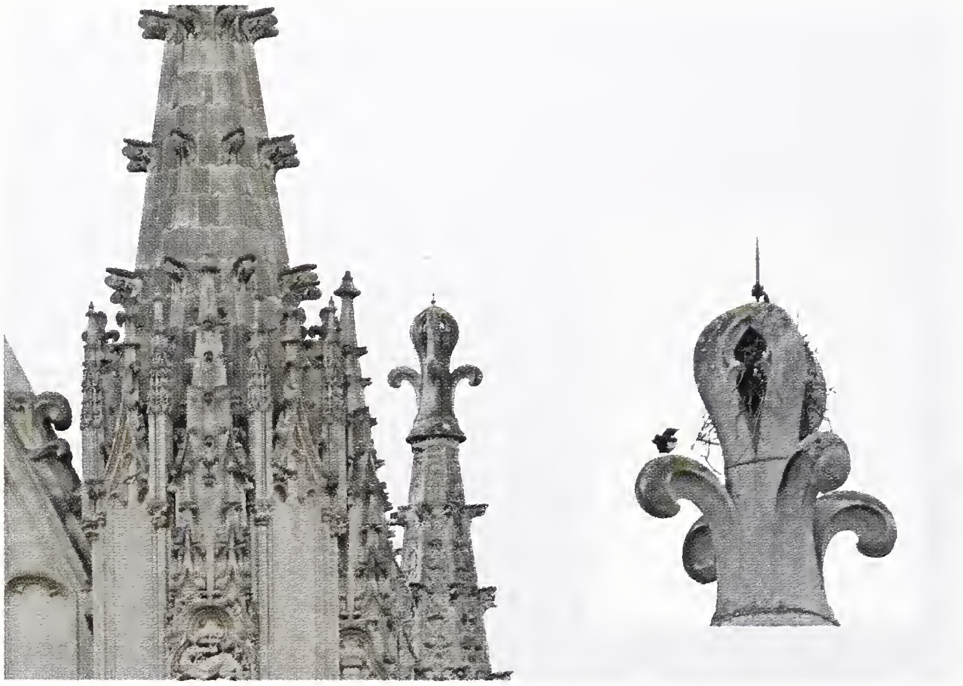
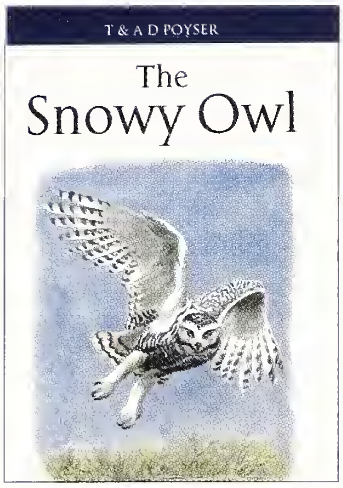

David Thorns

178. Magpie *Pica pica* nesting on the spire of the Château de Vincennes, Paris, April 2012.

Philip S. Redman, 23 rue de Richelieu, 75001, Paris, France; e-mail philip.redman@yahoo.com

Reviews



The Snowy Owl

By Eugene Potapov and Richard Sale
Poyser, 2012
Hbk, 304pp; colour photographs, black-and-white illustrations
ISBN 978-0-7136-8817-7 Subbuteo code M21413
£50.00 *BB* Bookshop price £42.50

This volume is the second contribution by these authors to the Poyser series, following their 2005 volume on another enigmatic Arctic predator, the Gyr Falcon *Falco rusticolus*.

In common with many British birdwatchers, my only first-hand experience of Snowy Owls *Bubo scandiacus* involved one of the last of the Shetland birds on Fetlar back in the early 1990s. This book refers to 'one of the great ironies of Snowy Owl research' in that this most southerly and unusual of nest-sites for this species is one of the most thoroughly studied and documented.

The authors also acknowledge the significant contribution to Snowy Owl studies made by Adam Watson on Baffin Island back in 1953, in what fortuitously turned out to be a peak lemming year. Travelling by dog sled, he studied no fewer than eight nest-sites (no mean feat with a species that breeds at such low densities) and his resulting paper on breeding behaviour and diet is still regarded as a seminal work. This highlights one of the main difficulties in studying this species. It may be a large bird with striking plumage, but it breeds at low densities in some of the most remote landscapes in the world. As a consequence, knowledge is often hard won and an understanding of the bird has had to be pieced together from chance encounters or the study of small numbers of birds here and there. I was struck by how often the scientists whose observations are reported in the book were actually in the Arctic to study other species, but took the opportunity to record their observations of Snowy Owls when the opportunities arose.

The fact that part of the Snowy Owl population moves south in autumn, into areas with a higher human population, makes it a far easier bird to study in winter and as a result the literature is heavily biased towards this time of year. The book includes an interesting account of the birds that regularly wintered at Logan International Airport in Boston. They have been especially well studied because of the threat posed to aircraft, made real when a Snowy Owl destroyed one of a jet aircraft's two engines on takeoff in the early 1990s. Since then, all wintering birds have been captured and relocated, and the opportunity has been taken to fit satellite tags to some. This, and similar remote-tracking studies, has provided vital data on movements and mortality. Of a sample of 20 birds tagged at Logan, three were shot in Massachusetts before having the opportunity to migrate back north in spring.

This is certainly a very thorough treatment of the species, helped by the lead author's access to the considerable Russian literature, and it includes all the main subject areas expected in a Poyser monograph. It is rather heavy going at times, however, and some sections read more like a scientific paper than a typical Poyser. The inclusion of summaries of experimental procedures, modelling approaches and statistical analyses does not help the flow of the book and it is sometimes a bit of a battle to pull out the key points. To take one example, the chapter on diet does not include any tables summarising Snowy Owl prey items but devotes a whole page to a table of regression equations for calculating prey body weights from bone remains.

Despite these reservations, this is an impressive and detailed volume and a welcome addition to this series. It will perhaps be appreciated most by fellow scientists, who are more likely to be comfortable with the writing style and the complex terminology sometimes employed. As with many other books in the series, it will no doubt be the standard reference for this species for many years.

Ian Carter

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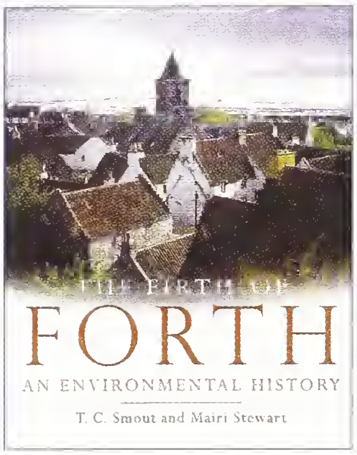


The Firth of Forth: an environmental history

By T. C. Smout and Mairi Stewart
Birlinn, 2012
Pbk, 306pp; 16 colour photographs, many black-and-white photographs and figures
ISBN 978-1-78027-064-7 Subbuteo code M21602
£14.99 *BB* Bookshop price £13.49

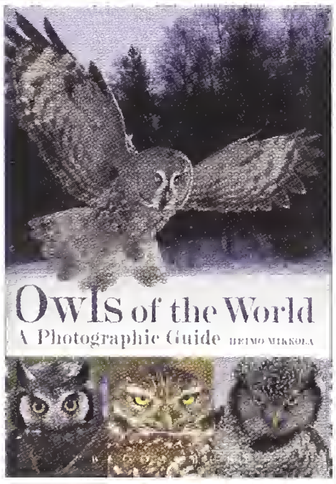
This is not a bird book but it is nevertheless a fascinating piece of both social and environmental history, which quickly had me captivated. Drawn to the book by its title, since I live on the outer shores of the Forth, I began by looking for ornithological references, but soon found other distractions.

Much of the book deals with the sorry tale of the ebb and flow (mostly ebb) of natural resources harvested by people living along the shores of the Forth over the last 10,000+ years, although most of the detail covers just the last few hundred years, a period for which we have much more direct evidence. A succession of fish and shellfish harvests for various species have left us with a greatly impoverished marine fauna. Other problems that have affected the Forth are land claim and pollution. It is estimated that, in the last 400 years, 45–55% of the intertidal area of the Forth has been 'reclaimed'. The impacts of pollution increased as the human population grew, although the sewage deposited off Leith supported flocks of over 40,000 ducks right up until the late 1970s. (In the winter of 1969/70 there were estimates of 30,000–40,000 Greater Scaup *Aythya marila*, up to 4,000 Common Goldeneye *Bucephala clangula* and 5,000–8,000 Common Pochard *A. ferina*). Water purification laws and the decline of industry mean that the Forth is now much cleaner.

In the final chapters the avifauna of the Firth of Forth takes centre stage with chapters devoted to the Northern Gannets *Morus bassanus* of the Bass Rock and the seabird colonies, mainly on the Isle of May but also on other islands in the firth. These chapters are a real treasure trove of information about the history of the breeding birds of these islands. Being on an island provided little protection from egg-collectors and shooting 'tourists' but following protection the numbers have, until more recently, seen unprecedented increases. Part of the reason for this success is thought to have been the removal of competition for prey (smaller fish) from larger fish such as cod and herring. But the now-familiar tale of declines in some species in more recent years is also discussed.

This book is easy to read yet crammed with fascinating facts, so is excellent value at less than £15.

Mark Holling



Owls of the World: a photographic guide

By Heimo Mikkola
Christopher Helm, 2012
Hbk, 512pp; 750+ colour photos, distribution maps
ISBN 978-1-4081-3028-5 Subbuteo code M21327
£35.00 *BB* Bookshop price £30.00

Owl taxonomy is in a greater state of flux than that of any other non-passerine group. As recently as 1991, Clements, in his *Checklist of the Birds of the World* (4th edn), listed 178 species of owls. The intervening 20 years have seen much work done on owl DNA coupled with a great increase in our knowledge of their vocalisations, ranges and biology. This has led to a massive increase in the number of owl species recognised today. This book identifies 249 species of owl and is honest enough to admit that it will not be the last word on owl taxonomy.

The opening chapters deal with what makes an owl, the nature of owls, evolution and taxonomy and owls and humans. Well written and illustrated, these offer an interesting and authoritative overview of these subjects. I was, however, surprised to learn nothing of the differences between the two closely related families, the Tytonidae and the Strigidae, which together

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comprise the Strigiformes or owls.

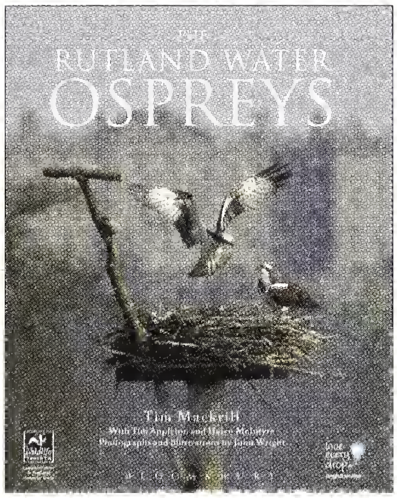
The meat of the book is of course the 249 species accounts. There are sections on identification, call, food and hunting, habitat, status and distribution, geographical variation and similar species plus range maps for each species. Many accounts are understandably brief, especially when dealing with rare and little-known species, but a little more diligent research would have filled in a few gaps. Nothing is given in the food and hunting sections of Balsas Screech Owl *Megascops seductus* or Guatemalan Pygmy Owl *Glaucidium cobanense* amongst others, yet their diets are listed in *HBW*.

Vocalisations are obviously very important for both finding and identifying nocturnal owls. The sections on call are a major let-down: often only a single call type, usually an advertising call, is described. While I have some sympathy here, in that the function of many owl calls is poorly known, in many cases a range of calls are well known. For the common and wide-ranging Burrowing Owl *Athene cunicularia*, for example, the only call described is given as a 'hollow, plaintive *coo-coo oo*'. A quick visit to www.xeno-canto.org reveals some of the diversity of calls emitted by this species, even if the same call-type has its function described differently there. Another perennial problem is transcribing these calls. It is tempting to say that the author doesn't give two hoots regarding this problem, and this view is confirmed when reading the accounts of the 24 *Strix* species.

The author acknowledges borrowing heavily from other works, notably König *et al.* (*Owls of the World*, Christopher Helm, 2008). By doing so, however, errors are perpetuated, particularly in the distribution and range maps. To wit the Bismarck Hawk-Owl *Ninox variegata* does not occur on New Britain and the Cinnabar Hawk-Owl *N. ios* is now known to occur more widely on Sulawesi than shown. It would help greatly if such facts had been properly checked.

Despite these faults, this is a well-produced and undeniably lovely book. It showcases over 750 colour photographs depicting all but a handful of the world's species. Many are stunning, a fitting tribute to this diverse group which has long fascinated mankind. These photographs alone are reason enough to add this volume to your shelf.

Richard Schofield



The Rutland Water Ospreys

By Tim Mackrill, with Tim Appleton and Helen McIntyre, photographs and illustrations by John Wright

Bloomsbury, 2013
Hbk, 160pp; colour illustrations throughout
ISBN 978-1-4081-7414-2 Subbuteo code M21422
£20.00 *BB* Bookshop price £17.00

I have maintained a keen interest in the progress of the Rutland Ospreys *Pandion haliaetus*, in large part because of my involvement in the East Midlands Red Kite *Milvus milvus* reintroduction, in nearby north Northamptonshire. The first young Ospreys, taken from nests in Scotland, were released in 1996, one year after the first batch of Red Kites, and both species have gradually become re-established in the area over the intervening period. The two new arrivals even interact at times and Red Kites are not beyond pilfering the odd fish from active Osprey nest-sites. Locally breeding Red Kites probably outnumber Ospreys by a factor of over 20 to one but, as explained in the book, that is largely a reflection of the significant challenges involved in restoring a bird like the Osprey, with its highly specialist diet and hazardous long-distance migration.

The bulk of the book is taken up with highly readable year-on-year accounts of the project, from the initial preparations back in 1995 through various milestones such as the first release, the first returning bird and the first successful breeding. Lessons are learnt along the way and there are some notable setbacks described with real feeling by those directly involved. Although the book focuses on the release site and breeding area centred on Rutland Water, other parts of the story are not forgotten. Satellite tracking has helped to reveal the migration routes taken by released Ospreys and the authors provide accounts of exciting trips to the Pyrenees and West Africa to try to connect with migrating birds. The recent breeding attempts in Wales (partly involving birds released at Rutland) are dealt with though, surprisingly, I could find no mention of the recently

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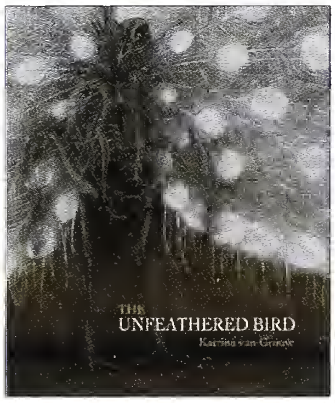
established breeding birds in Cumbria.

The book is very much a joint effort by the key individuals involved in the project. There is a foreword by Roy Dennis, whose expertise, enthusiasm and enviable powers of persuasion helped to get things started. And there are a number of diary-style contributions from some of the many hundreds of volunteers who have helped with monitoring and nest protection over the years. A special mention must go to John Wright who, on this evidence, appears to be equally skilled as a photographer and artist. His work appears on almost every page and images of the individual birds and events being described really help to bring the story to life.

The final chapter focuses on some of the wider conservation benefits of this pioneering project and the legacy of work undertaken, an important aspect given that reintroductions are by no means universally popular and must justify the funds spent on them. The authors deal with a regular criticism of such projects by arguing that there is nothing at all unnatural about the small breeding population now established in central England. On the contrary, it is the bird's continued absence from the vast majority of lowland England and Wales, as a direct result of past human intervention, that is unnatural. That raises interesting questions about the future. The work at Rutland has already helped to inspire release projects in Spain and Italy and the authors make a strong case that further releases would be useful in southern Britain to help speed up the process of recolonisation.

Ian Carter



The Unfeathered Bird

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ISBN 978-0-691-15134-2 Subbuteo code M21377
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This is a remarkable book! Large format, well presented, well written, beautifully illustrated with the author's own line-drawings. But (and it's a big 'but'), it is all about birds with their feathers off! Effectively, it is a textbook of avian anatomy, covering musculature and skeletal structure, with a detailed commentary on the adaptive significance of the various characteristics defined in the drawings.

It starts with a brief 'generic' section that details the basics of avian anatomy, with sections on the trunk, head and neck, wings, and legs. This describes and illustrates the commonality of the avian body and serves as an introduction to the rest of the book, which is a description of the structure and adaptations of individual orders and families. The taxonomy is a mix of ancient and modern, with major groups that follow Linnaeus and include Accipitres, Picae, Anseres, etc. These are often based upon external appearance rather than true evolutionary relationships, but serve to bring together groups with common adaptations. For example, Accipitres includes owls, vultures and diurnal raptors (all 'hooky-beaks'), while Anseres encompasses waterfowl, penguins, divers, grebes – and just about everything else (more or less) that has webbed feet. A slightly bizarre taxonomy to the modern eye, but it serves to allow the author to pull together some excellent illustrations of convergent evolution.

The bulk of this book takes each of the major groups of birds and illustrates their (featherless) anatomy with a series of superb drawings supported by an authoritative text. Some illustrations are fascinating, including a Gentoo Penguin's *Pygoscelis papua* tongue showing the barbs that help it hang onto its fish prey! I found the section on penguins particularly interesting. The author points out that Common Guillemots *Uria aalge* are the largest of the auks, and are about the same size as the smallest of the penguins, arguing that you can't get any bigger if you want to fly. And, of course, in the northern hemisphere, most auks need to fly to avoid terrestrial predators. The flightless Great Auk *Pinguinus impennis* is (or rather was) convergent upon the larger penguins, and Katrina van Grouw shows how this convergence is based upon a rather different body plan. I also found in these pages one of the better explanations of why woodpeckers do not do themselves serious self-harm when hammering on a tree trunk – again with beautiful illustrations to support the argument.

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All in all, this is a fascinating book, with masses of detailed description of birds' structure, and the author relates this to their function and ultimately ecology. I doubt whether there really is such a beast as a 'typical' *BB* reader, and I wonder whether this book would appeal sufficiently to encourage them to part with £35. However, for three years at Durham in the 1960s, my undergraduate studies in zoology included a weekly dissection. My final examination included the dissection of the wing musculature of a pigeon. How I wish that I had had this book alongside me during those two traumatic hours!

David Parkin

Recent reports

Compiled by Barry Nightingale and Harry Hussey

This summary of unchecked reports covers the period from early March to early April 2013.

Headlines With relentless cold easterlies for much of the period, the few rarities included a Pallid Harrier in Surrey – its identification confirmed after it had departed – and now two wintering Northern Harriers in Co. Wexford, Killdeers in Co. Donegal and Lancashire & N Merseyside, a Black-throated Thrush in North-east Scotland, and belated news of a White-throated Sparrow in Somerset. Scarce southern European migrants remained just that – scarce, but included three Black Kites, a handful of Kentish Plovers on the English south coast and a Red-rumped Swallow on Scilly.

Cackling Goose *Branta hutchinsii* Long-stayers: Islay (Argyll), to 29th March; Mersehead (Dumfries & Galloway), to 12th March; The Mullet (Co. Mayo), to 13th March; North Uist (Outer Hebrides), to 6th April. **Red-breasted Goose** *Branta ruficollis* Farlington Marshes (Hampshire), long-stayer to 5th April; Oare Marshes (Kent), 6th April.

American Wigeon *Anas americana* Long-stayers in Devon, Lincolnshire, Orkney and the Outer Hebrides; Quoile Pondage (Co. Down), 29th March to 6th April; Little Neston (Cheshire & Wirral), 31st March to 7th April; Bodenham Lake (Herefordshire), 31st March. **Black Duck** *Anas rubripes* Long-stayer, Achill Island (Co. Mayo), to 4th April. **Blue-winged Teal** *Anas discors* Threave (Dumfries & Galloway), long-stayer to 29th March; Ballylongford (Co. Kerry), 27th–30th March.

Ferruginous Duck *Aythya nyroca* Ham Wall (Somerset), long-stayer to 21st March; Otmoor (Oxfordshire), 25th March to 7th April. **Lesser Scaup** *Aythya affinis* Long-stayers in Cornwall and East Glamorgan; Oxford Island (Co. Armagh), 3rd February to 29th March; Auchendores/Leperstone Resrs (Clyde), 13th–30th March; Brockholes and Fishmoor Resr (Lancashire & N Merseyside), 15th–16th March; Ogston Resr (Derbyshire), 16th March; Wellington GP (Herefordshire), 16th March to 8th April; Freiston (Lincolnshire), 19th March to 7th April; Bryn Bach CP (Gwent), 27th March to 8th April; Saltholme (Cleveland), 3rd–8th April. **King Eider** *Somateria spectabilis* Long-stayers, Bluemull Sound, 29th March and Whalsay (both Shetland), 8th April. **Harlequin Duck** *Histrionicus histrionicus* North Uist, long-stayer to 6th April. **Surf Scoter** *Melanitta perspicillata* Long-stayers in Denbighshire/Caernarfonshire (up to three), Dumfries & Galloway, Fife, Co. Kerry and Pembrokeshire; Deer Sound (Orkney), two, 11th March; Ben Head (Co. Meath), one or two, 16th March to 6th April; Rosslare (Co. Wexford), 16th March to 6th April; Salterstown (Co. Louth), 17th March; Balbriggan Telpyn Point (Carmarthenshire), two, 18th March; Balbriggan (Co. Dublin), 25th–29th March; Harris (Outer Hebrides), 30th March; Seton Sands (Lothian), one or two, 31st March to 8th April.

Red-throated Diver *Gavia stellata* Dungeness (Kent), 2,600 past on 7th April. **Pacific Diver** *Gavia pacifica* Mount's Bay (Cornwall), long-stayer intermittently to 1st April. **White-billed Diver** *Gavia adamsii* Barmston (Yorkshire), 14th March; Portsoy (North-east Scotland), three, 17th March, at least one 28th March and three 1st April; South Ronaldsay (Orkney), 19th and 30th March and 2nd–8th April; Lewis (Outer Hebrides), 27th March, two 30th March to 2nd April, one to 8th.

Cattle Egret *Bubulcus ibis* Hoveringham GP (Nottinghamshire), 28th March. **Glossy Ibis** *Plegadis falcinellus* Long-stayers in Hampshire/

179. Female Desert Wheatear *Oenanthe deserti*, Rattray Head, North-east Scotland, March 2013.

Simon Knight

Sussex and Pembrokeshire; Coventry (West Midlands), 12th March; near Abergwyngregyn (Caernarfonshire), 13th March.

Pied-billed Grebe *Podilymbus podiceps* Ham Wall, long-stayer to 8th April.

Black Kite *Milvus migrans* Ardfert (Co. Kerry), 20th March; Gwithian Towans (Cornwall), 27th March and 1st April; Stanmer Park (Sussex), 8th April. **White-tailed Eagle** *Haliaeetus albicilla* Barningham Moor (Yorkshire), 13th March; Frampton Marsh (Lincolnshire), 19th–20th March; one seen in various localities in Norfolk and Suffolk between 19th March and 7th April. **Northern Harrier** *Circus cyaneus hudsonius* Tacumshin/Lady's Island (Co. Wexford), long-stayer to 30th March; another, at Cahore (Co. Wexford) on 8th April, has apparently been present all winter. **Pallid Harrier** *Circus macrourus* Papercourt Water Meadows (Surrey), 31st March. **Gyr Falcon** *Falco rusticolus* Fetlar (Shetland), 26th March.

American Coot *Fulica americana* Murloch (Co. Galway), long-stayer to 8th April.

Killdeer *Charadrius vociferus* Killybegs (Co. Donegal), 29th March; Alston Wetland (Lancashire & N Merseyside), 7th–8th April. **Kentish Plover** *Charadrius alexandrinus* Ferrybridge (Dorset), 24th March and 1st April; Rye Harbour (Sussex), two, 25th March to 2nd April, one to 6th; Swalecliffe (Kent), 28th–29th March; Old Hall Marshes (Essex), 7th April; Pegwell Bay (Kent), 8th April. **Lesser Yellowlegs** *Tringa flavipes* Ernesettle Creek (Devon), long-stayer to 7th April; Skerries (Co. Dublin), 2nd April. **Long-billed Dowitcher** *Limnodromus scolopaceus* Gann Estuary (Pembrokeshire), long-stayer to 7th April; Alkborough Flats (Lincolnshire), 3rd April.

Forster's Tern *Sterna forsteri* Galway Bay (Co. Galway), long-stayer to 28th March. **Bonaparte's Gull** *Chroicocephalus philadelphia* Long-stayers Ballygally (Co. Antrim), to 18th March; Ogmore Estuary to 17th March and Cardiff Bay (both East Glamorgan), to 2nd April; Skerries (Co. Dublin), 2nd–18th March; Thurso (Highland), 30th March and 6th April. **Mediterranean Gull** *Larus melanocephalus* Studland (Dorset), 350, 24th March.

Snowy Owl *Bubo scandiacus* Ben Macdui (North-east Scotland), long-stayer to 5th April; Jura (Argyll), 28th March; North Uist, 1st–2nd April.

Penduline Tit *Remiz pendulinus* Stodmarsh, long-stayer to 6th April; Dungeness (both Kent), two, 29th March. **Red-rumped Swallow** *Cecropis daurica* St Mary's (Scilly), 23rd March. **Pallas's Leaf Warbler** *Phylloscopus proregulus* Moor Green Lakes (Berkshire), long-stayer to 8th April. **Rose-coloured Starling** *Pastor roseus* Exminster (Devon), long-stayer to 8th April. **Black-bellied Dipper** *Cinclus c. cinclus* Thetford (Norfolk), long-stayer to 30th March, with two on 21st–28th.

Black-throated Thrush *Turdus atrogularis* Banchory (North-east Scotland), 24th–27th March. **Northern Wheatear** *Oenanthe oenanthe* Along with most other summer migrants, slow to arrive during March, but influx into southwest England 23rd–27th March, with daily peaks of 250 Portland (Dorset). **Desert Wheatear** *Oenanthe deserti* Rattray Head (North-east Scotland), long-stayer to 26th March.

White-throated Sparrow *Zonotrichia albicollis* Churchstanton (Somerset), 23rd January to 3rd March. **Little Bunting** *Emberiza pusilla* Rawcliffe Moss (Lancashire & N Merseyside), 13th March; Houghton-le-Spring (Co. Durham), 8th April.

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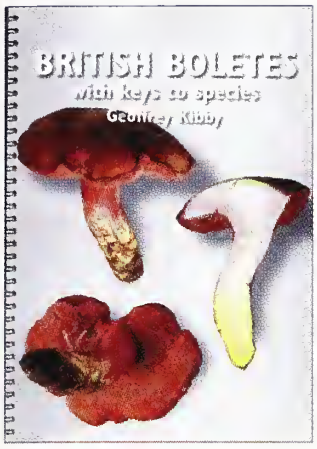

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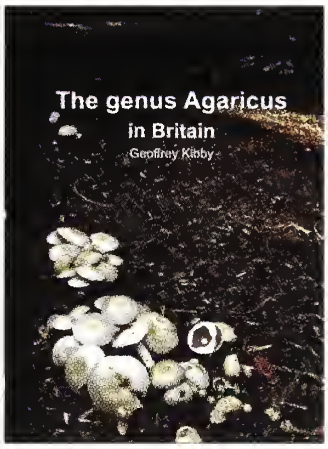

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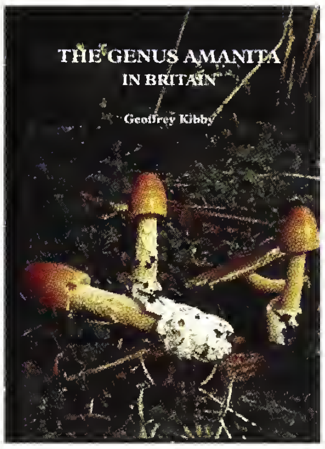

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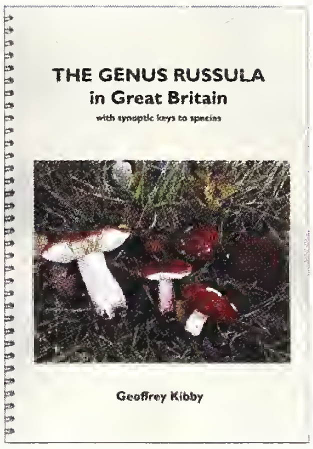

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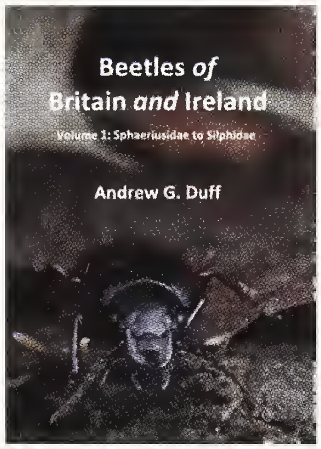

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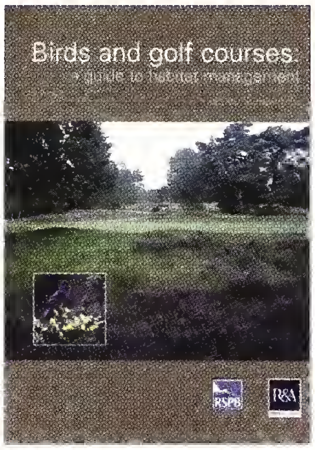

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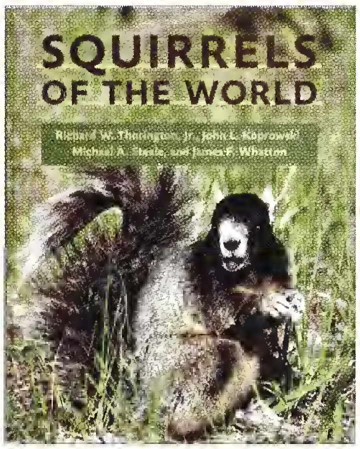
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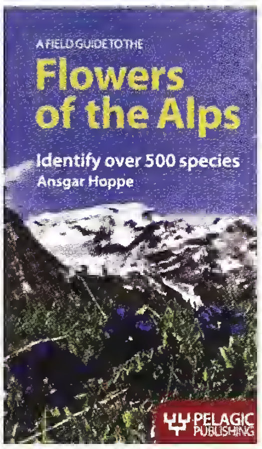

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